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USER EXPERIENCE OF ACADEMIC LECTURING STAFF IN THE USE OF A LEARNING MANAGEMENT SYSTEM TOOL: A CASE STUDY AT AN OPEN DISTANCE LEARNING INSTITUTION IN SOUTH AFRICA

by

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I declare that the above dissertation/thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

_____ ___ 28/2/2017 _____

SIGNATURE DATE

SUMMARY

The teaching model in Open Distance Learning is moving towards fully integrated information and communication technology applications, therefore, academic lecturers need to have a strong comfort level with the use of technology tools. The academic lecturers are qualified and experienced subject matter experts but this does not translate to having the necessary technical competencies to do online teaching. They consequently could experience feelings of incompetency to facilitate courseware on a technology platform.

The study identified the factors that influence the user experience when using a Learning Management System (LMS) in an academic institution. The research design comprises a convergent, parallel design mixed-method case study. A literature review was conducted to abstract the factors that influence the user experience into a conceptual framework. An expert review was conducted to validate the conceptual framework and then a questionnaire-driven survey was performed. The quantitative analysis of the survey results revealed that eight of the nine factors proposed in the conceptual framework do have an influence on the perceived user experience of the academic when using the LMS. The qualitative analysis revealed that all nine of the identified factors do have an influence on the perceived user experience of the academic when using the LMS.

The contribution of this study is to present a conceptual framework of the factors that influence the user experience of the academic when using an LMS to improve our understanding of the experience of the academic and the practical challenges involved for academics that have to facilitate learning in an online environment The findings should be of interest to developers of LMSs and to institutions in support and training of academics that have to use the LMS.

KEYWORDS

User Experience; Learning Management Systems; Open Distance Learning; Academic institution; Usability; Virtual Learning Environments; Academic lecturer.

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ABBREVIATIONS

CMS	Course Management System
CPD	Centre for Professional Development
HCI	Human-Computer Interaction
ICT	Information and Communication Technology
IT	Information Technology
LMS	Learning Management System
ODeL	Open Distance Electronic Learning
ODL	Open Distance Learning
OER	Open Educational Resources
TPACK	Technological Pedagogical Content Knowledge
Unisa	The University of South Africa
UX	User Experience
VLE	Virtual Learning Environment

KEY TERMS

Key terms	Explanation
Affordances	Refers to the opportunities that various technologies and their unique attributes offer for learning and teaching activities
Blended learning	In this research blended learning refers to courses that are offered through printed material which is distributed by post and supplemented by using interactive tools on the learning management system in order to facilitate the courses online
Component	In this study components are considered as entities that are always present in user experience despite varying circumstances
E-learning	Learning that is supported by ICTs by instruction which includes content relevant to the learning objective, uses instructional methods and builds knowledge and skills
Factor	The word 'factor' is used throughout in the ordinary sense of the word, intended as characteristic or feature. No statistical factor analysis is implied or intended.
Learning Management System (LMS)	Also referred to as VLE, a software application for the administration, documentation, tracking, reporting and delivery of programmes and courses.
Open Distance Learning (ODL)	Refers to the use of distance education methods to support the open learning purposes and principles. An ODL approach is supposed to support students at any place at any time and accommodates pacing, different learning methods, assessment and articulation.
Open Educational Resources (OER)	Educational Resources (including curriculum maps, course materials, textbooks, streaming videos, multimedia applications, podcasts, and any other materials that have been designed for use in teaching and learning) which are freely available for use by educators and students.
Usability	The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use (International Organization for Standardization, 1998)
User Experience (UX)	A person's perceptions and responses that result from the use and/or anticipated use of a product, system or service (FDIS, 2009) .
Virtual Learning Environment (VLE)	See *Learning Management System*.

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1.1 Introduction

In the last two decades the method of delivery of study material in distance education institutions has changed from mainly print based delivery to primarily electronic delivery. The impact of the postal strike experienced in 2014 in South Africa, exposed the vulnerability of the postal system and the impact it had on providing reliable distribution of study material. As stated by a news release by the South African Broadcasting Corporation in September 2014: "The strike at the South African Post Office over the past few months has had a negative impact on Unisa processes and on our students. During this period, many assignments have not been delivered to Unisa and marked assignments to be returned to students have not yet been delivered" (Anon, 2014). The strike action at the post office caused disruption in communication between students and the university. Study material was often not received in time by the students and posted assignments were received too late by the University of South Africa (Unisa) to be marked before examinations started (VanNiekerk & Schmidt, 2016). The incident accentuates the urgency to expand the options of alternate forms of distribution of study material and administration of assignments. In addition to the inherited vulnerability of the postal service as a delivery mechanism, the emerging technology and especially the internet have forever changed the distribution of knowledge and the governance of education.

There are expectations from students and other higher education stakeholders to increase the use of information and communication technologies (ICT) to enhance quality and flexibility in education (Cantoni, Cellario & Porta, 2004; Andrews & Haythornthwaite, 2007; Aktaruzzaman, Huq Shamim & Clement, 2011; Al-Shboul, 2013). The addition of technology offers the opportunity to facilitate Open Distance Learning (ODL) that entails a more flexible courseware delivery and potentially personalised enhanced learning engagement.

Technology can support learning effectiveness, more learner-centred approaches, improved interaction and allows users to collaborate online (Bates, 1997; Lonn & Teasley, 2009). The technology-enabled environment or Virtual Learning Environment (VLE) may consist of a program or platform that facilitates electronic learning or a learning management system (LMS) (Martin, Martínez, Revilla, José, et al., 2003; Paulsen, 2003; Zaharias & Mehlenbacher, 2012). VLEs or LMSs are electronic information systems for the management of learning processes, by providing adequate space for lecturers to upload content and educational materials, as well as collaboration facilities, inter alia through virtual classes and class content. VLEs were initially created to support distance learning. Most LMSs attempt to replicate a classroom design model. However, at the same time large numbers of students can be accommodated and study material and discussions are delivered to all students who have online access (Fanning, 2008; Müller, 2013; Bates, 2015). Such e-learning systems are also sometimes called course management systems (CMS), but this research will mainly refer to it as learning management systems, or LMSs.

1.2 Background

Unisa is the largest and oldest ODL institution in Africa (Unisa, 2016a). Approximately a third of all South African tertiary students enrol at this tertiary educational institution. Since 1946, this university became the first public university in the world to teach exclusively by means of distance education and hence provided people who were otherwise excluded from tertiary education due to long distances from universities, with access to education. In the South African context of the time, it is important to note that the university provided education from its beginning, to students irrespective of race, colour or religion. Unisa follows an ODL model of teaching which denotes learner-centeredness, flexibility of learning facilitation and provision of relevant learner support. The university, as other similar institutions, had to adapt to the changing environment. The paper based education had to be transformed to digital communication which includes blended techniques such as integrated and mixed media and courseware with various modalities for learning development and facilitation.

The three core business areas of Unisa are teaching, research and community engagement. Tuition is thus one of Unisa's three core areas of concern. The university's study disciplines include the humanities, business and management, law and criminal justice, agriculture and environmental sciences, and science, engineering and technology. Unisa presently offers an ample number of study choices, ranging from short courses and certificate programmes to three-and four-year degrees and diplomas, to over 400 000 current students from 130 countries in Africa and all over the world (Unisa, 2016b).

Unisa as an ODL institution has adopted an Open Distance e-Learning (ODeL) model towards fully integrated ICT applications. The transition includes the offering of fully online delivery of courses or *blended learning*. In published research the term *blended approach* has been defined in various ways. Ocak's (2011) definition for blended learning is "balanced utilization of computer supported collaboration and communication tools (email, listserv, forum etc.), self-paced learning tools/materials (websites, online resources etc.) and LMSs in conjunction with in-class teaching practices by higher education faculty" (2011:690). This is similar to the definition of Babic (2007) who refers to blended learning that "combines different models of learning and teaching: in a traditional classroom (which provides e-learning technologies) and a virtual learning environment" (2007:3).

Since this study took place in an ODL institution, which only offers distance learning, blended learning refers in this research to courses that are offered through printed material which is distributed by post and supplemented by using interactive tools on the LMS in order to facilitate the courses online. According to the Unisa Institutional Operational Plan for 2013 (Unisa Operational Plan, 2013) one of the core strategies (Strategy 1.8) is to promote the appropriate adoption and use of cutting-edge technology in teaching and learning. For content provision this implies that the academic lecturers need to use the provided VLEs and LMSs for management and course delivery. This requirement has created some reluctance amongst some academics, as they are knowledgeable in preparing and delivering print based study material. To successfully teach or facilitate with the use of technology, instructors need to have a strong comfort level with the use of technology tools (Kyei-Blankson, Keengwe & Blankson, 2009). The challenge is that the developers of LMSs should improve the tools to support and serve the needs of the academic facilitators and students. However, it is the responsibility of the academic facilitator to be knowledgeable and cognisant of the functionality on how to utilise the tools in pedagogically appropriate ways in order to take advantage of the affordances that the LMS offers (Vrasidas, 2004). The role of the academic as a facilitator of online or blended learning has changed from delivering content, to providing feedback and engaging with

students, this means that the academic has to establish social presence in the virtual environment (Fanning, 2008). More cognisant development (training) provision and other support are needed to increase the participation of the academics in facilitation of courses in an online environment.

At the Unisa, the technology tool that is currently the main tool of instruction used for delivery of online courses is an adaption of the Sakai LMS that is also known by the staff and students as *myUnisa*. An LMS provides a platform that supports social constructivist theories with the demands of the knowledge based society. Furthermore it offers the academic the tools for curriculum design and course delivery and several communication platforms in order to facilitate learning in an online environment. The Sakai LMS has the features common to LMSs, including course materials distribution, learning units, discussion forums, announcements and self-assessment (Simonson, 2007).

The improvement of ICTs, together with the emergence of Internet technologies has provided significant opportunities for institutions of higher education to meet the educational needs of the students and educationalists. While several studies have focused on the effectiveness and benefits of e-learning, few have focused on understanding and measuring the user experience with the academic lecturing staff's usage of the e-learning system (Davis & Wong, 2007; Zaharias & Pappas, 2016).

1.3 Problem Statement

Unisa's academic lecturing staff roles are changing and there is a requirement for new skills and professional growth (Buczynski & Mall, 2010; Gautreau, 2011). Adaption to the use of technologies for deliverance of teaching and online learning material is essential, but to be able to do so the continuation of professional development training and support is required (Cant & Bothma, 2011). Although the academic lecturing staff are qualified and experienced subject matter experts, this does not translate into them having the necessary technical pedagogical competencies (Koehler & Mishra, 2009) to do online teaching. They consequently could experience feelings of incompetency to distribute courseware on a technology platform (Partala & Kallinen, 2012). In an effective online learning system the focus should not be to learn how to use the technology (except when Information Technology is the subject) but how the learner-centred system should facilitate and encourage the learners to focus on the task, which is to acquire knowledge (Zaharias, Vassilopoulou & Poulymenakou, 2002).

The conundrum that arises is that the institution has high expectations from the academic teaching staff as they are expected not only to be experts in their own discipline area, but are also expected

to do instructional design to create their own online course sites, irrespective of their capability and confidence in using educational technologies or their competence as educational instructional designers (Weaver, Spratt & Nair, 2008). The development and facilitation of courses, as well as structuring and monitoring of online interactions imply a significantly diversified workload on academic lecturing staff (Papastergiou, 2006). The consequence is that in such an unfamiliar technological environment, an experienced academic could fail to deliver study material of quality (Salajan, Welch, Peterson & Ray, 2011).

Research has shown that the *user experience* (UX), in this case the academic's experience with the use of technology, could influence and determine the efficiency and effectiveness of the use of technologies (Keengwe, Kidd & Kyei-Blankson, 2008; Kyei-Blankson, Keengwe & Blankson 2009; Kazley, Annan, Carson, Freeland, Hodge, Seif & Zoller 2013). Perceived quality of the UX has a positive correlation with increase of usage of the technology (Fehnert & Kosagowsky, 2008).

Additional to the challenge to interact with technology, the traditional courses have to be converted into e-learning. This may represent a complex effort requiring thorough planning, to make the conversion effective and efficient. Furthermore, the applicable technology may be experienced by the academic lecturers as intimidating, confusing or time consuming. In e-learning the roles of the academic lecturing staff extends to include being facilitators of the online learning processes, designers of these experiences and formulating instructional design, which focus on content and learning processes (Cantoni , Cellario & Porta, 2004).

Thus, the problem this study addresses is to explore the factors that influence the UX of lecturing academics at Unisa when facilitating courses in the online environment. As mentioned in earlier research (Kyei-Blankson, Keengwe & Blankson, 2009), the perceived quality of the UX could enhance the use of the LMS.

1.4 Purpose of the Study

The aim of this research is to explore how the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution, could be represented. Research on the potential impact of technology application on learning and teaching, indicates that more studies are required to establish the underlying factors for underuse of the LMS for instructional and course delivery in universities in general and ODL universities in particular (Macharia & Nyakwende, 2010). It is essential to examine the aspects that could influence the integration of information technologies at all educational levels (Giesbers, Rienties, Tempelaar & Gijselaers, 2013).

In response to the need for the improvement of the confidence and competence of academic lecturing staff with the use of technology, this study explored the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution. The study examined the use, perceptions and training needs of the academic lecturing staff and proposes a framework to represent the factors that influence the academic lecturing staff's UXs with the use of the LMS in Unisa. This study supports the notion that the enhancement of the UX would allow the academic lecturing staff to focus on and achieve high task performance (Zhang, Small, Von Dran & Barcellos, 1999) and thus improve the quality of online courses.

A student-centred approach requires collaboration and interactive discussions among students and the academic lecturers (Kearsley & Shneiderman, 1998; Lewis & Abdul-Hamid, 2006). Although the students in ODL are seen as the main foci of the educational process (Unisa, 2008) and a number of other research in this regard, has focused on the student (Aktaruzzaman et al., 2011; Mulwa, Lawless, Sharp & Wade, 2011; Liaw & Huang, 2013; Das, 2012; Rubin, Fernandes & Avgerinouet, 2013), this study focused on the lecturing academics' perspective regarding the use of the LMS. While e-learning in ODL has to be centred around the learner, the "quality of a learning process is not something that is delivered to a learner by an e-learning provider but rather constitutes a process of co-production between the learner and the learning-environment" (Ehlers 2012:1). Only a limited number of studies of LMS could be found that actually considers parameters for the UX or usability concerns from the academic or lecturer's perspective (Gamage, Tretiakov & Crump, 2011; Fresen, 2011; Weaver et al., 2008). A positive UX with the LMS could support efficiency and effectiveness, which is improved performance when using the system (Nielsen & Levy, 1994). A usable LMS could reduce the academic's time invested in developing and managing the online course so that they could focus on quality of the content to be delivered (Inversini, Botturi & Triacca, 2006).

The resulting framework could assist Unisa, as well as other educational institutions, to take cognisance of the factors that influence the UX of academic lecturing staff when using LMSs. It could inform the professional development initiatives, in developing training programs of educational institutions that would enable the academic lecturing staff to incorporate the technology to deliver

courses online through the use of an LMS. In addition it could provide input to the Sakai[1] (Open Source) users group to be of assistance with the enhancement of the Sakai development platform in order to improve the UX for academics that use the LMS.

1.5 Research Questions

The research question that guided this study is as follows:

How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution, be represented?

The sub research questions that directed and guided the study towards answering the main research question are the following:

Sub research question 1: ***What are the components of the UX when using an LMS?***

Sub research question 2: ***What are the factors that will influence the UX when using the LMS in an ODL institution?***

1.6 Research Design and Methodology

This research aims to explore how the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution, could be represented.

The research is underpinned by an interpretivistic research philosophy through the application of an inductive reasoning approach, executed through a single case study design, adapting the convergent parallel mixed method for data collection purposes (Yin, 2003; Creswell & Clark, 2011). Terre Blanche, Durrheim and Painter (2006) explain that an interpretive paradigm involves taking people's (in this case the *users of the LMS*) subjective experiences as important of what is real for them, making sense of people's (the *users*) experiences by understanding them and listening cautiously to what they know, tell us and believe (the epistemology). Hassenzahl and Tractinsky (2006) call UX a *strange phenomenon*, and calls for empirical research regarding UX.

[1] Sakai is an online collaboration and learning environment, with educators and developers from various institutions working together to develop a teaching platform which is used by higher education institutes, especially universities and colleges (http://sakaiproject.org).

This research endeavours to contribute to the knowledge base of UX and employs a single case study as described by Yin (2003). The case study was implemented through five phases (See Figure 1.1):

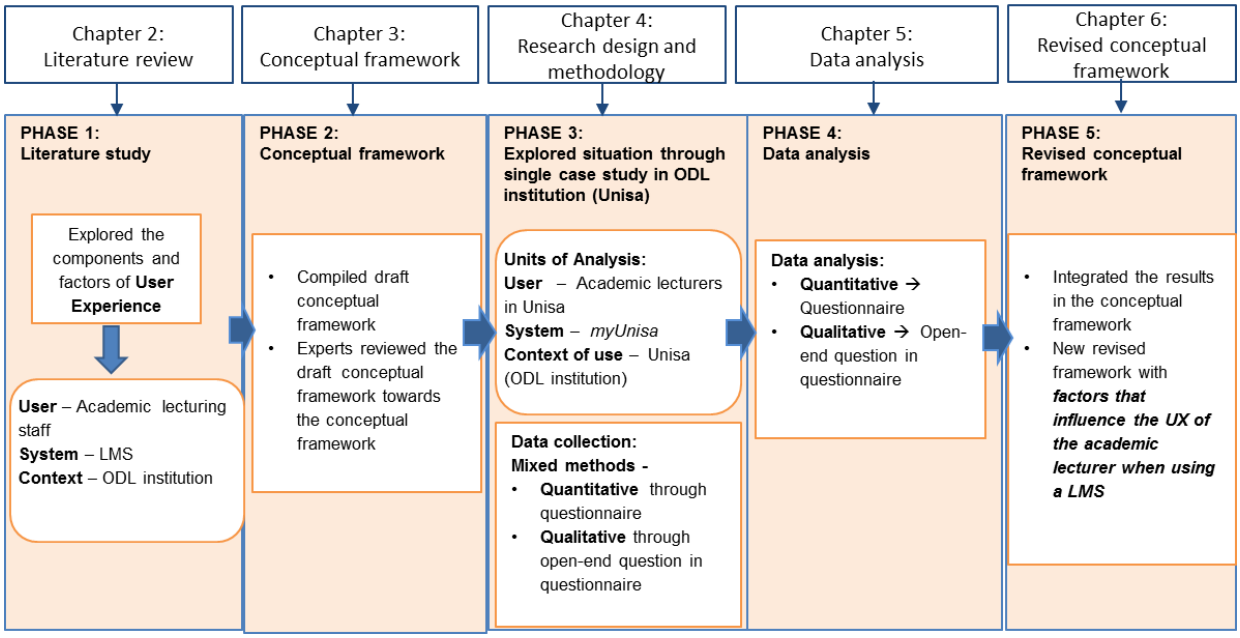


Figure 1.1: Schematic explanation of the research design applied in this study

Phase 1: Literature Study: The literature study aims to answer the first sub research question and examined existing relevant literature to identify the components of UX. In addition the literature study explores the factors that influence the UX when using an LMS. The outcome of the first phase is the identification of the components of the UX that will serve as the units of analysis for the single case study and addresses the sub research question 1.

Phase 2: The case study as outlined by Yin (2003) entails theory development prior to an engagement with the phenomena in the real world. A draft conceptual framework was constructed from the identified units of analysis in Phase 1 and presented factors identified from the literature, that influence the UX of academic lecturing staff using the LMS in an ODL institution. This phase aimed to answer sub research question 2 by presenting initial theories, as suggested by Yin (2003) as a draft conceptual framework of theories, propositions and structures from literature in order to guide data collection and analysis. The draft conceptual framework was reviewed and validated by five experts in the fields of education, Human-Computer Interaction (HCI) and ODL. This was done in order to ensure the comprehensiveness of the content, the correct use of language in the statements and to confirm the applicability and relevancy from the academic viewpoint in the ODL

environment. Based on their feedback, the necessary amendments were made to the draft conceptual framework.

Phase 3: Data collection: To explore how the UX presents it-self within the case, a questionnaire (Appendix B) was derived from the propositions in the reviewed conceptual framework and distributed to the respondents. The data collection instrument, the questionnaire, accommodated both the quantitative and qualitative data collection adapting the convergent parallel mixed method as outlined by Creswell and Clark (2011). In order to ensure that the questionnaire would yield the expected interpretations from the respondents, the quantitative section was evaluated by a statistician and pre-tested on a small sample group of participants. Insights gained were incorporated in the final version of the questionnaire. The questionnaire was distributed to 1640 academic staff members in the eight academic colleges at Unisa using the LMS (*myUnisa*) which facilitate courses online.

Phase 4: Data analysis: Analyses of the quantitative and qualitative data was done independently in accordance to Creswell and Clark's (2011) outline for a convergent parallel mixed data collection. Applying the multiplicity of data collection and analysis methods offered an opportunity for validating and triangulating the research findings through the use of quantitative and qualitative data capturing and analysis methods (Thurmond, 2001; Hunter & Brewer, 2006). The mixed methods approach was used to enhance credibility, triangulation, completeness and for contextual understanding (Bryman, 2007).

Phase 5: Revised conceptual framework: The results obtained from assimilating the quantitative and qualitative data analysis were integrated into the draft conceptual framework (see Phase 1) to compile a contextualised revised conceptual framework as a representation of the UX of academic lecturing staff in the use of an LMS tool in an ODL institution in order to answer the main research question.

Having outlined the research design the following section presents the ethical aspects of the research.

1.7 Ethical Aspects

In order to comply with the *Unisa Policy on Research Ethic*s (UNISA, 2013) the ethical aspects needed careful consideration to ensure that the rights of the participants were protected. The researcher adhered to the following ethical principles in conducting the research: informed consent; voluntary participation, anonymity, management of information and confidentiality.

In order to undertake the research, ethical clearance was obtained from Unisa's College of Science, Engineering and Technology's Ethics Committee (Appendix C). Since the participants were Unisa staff members, permission to use staff members in the research, was obtained from Unisa's Senate Research and Innovation and Higher Degrees Committee (SRIHDC) (Appendix D).

1.8 Scope and Limitations

The scope and limitations of the study are explained in sections 1.8.1 and 1.8.2 respectively.

1.8.1 Scope

The scope of the study is recognised as follows:

- The scope of the study is one ODL institution, the University of South Africa.
- The study focused on the UXs of the academic staff's interactions when using a *goal-oriented* teaching and learning tool.
- The expert review of the draft conceptual framework was done by experts in the fields of education, HCI and ODL, all who were computer literate academic staff.

The strength of the results is subject to the assumption that the 158 lecturing academics (who were approximately 10% of the population) that have completed the survey represent the population of lecturing academics in Unisa.

1.8.2 Limitations

The limitations for this study are briefly mentioned in order to address criticisms.

- In view of the fact that the UX of academics with the use of only one LMS was investigated, the generalizability of the findings across LMSs is limited. However it was the UX of the use of the LMS that was explored and not the LMS that was evaluated.
- Evaluation of the whole UX could be from the expectation of the user before using the system, interaction while using the system to reflection after using the system. Although the researcher is aware that the quality of UX changes over time and thus alters the UX over time, for this study, the data collection was mainly a reflection after the system has been used, or of the overall UX of the system.

1.9 Contribution of the Study

This study was undertaken to contribute to the domain knowledge of the UX of the academic and the practical challenges involved for academic lecturers that have to facilitate learning in an online environment. From an academic perspective the study is important because more research is necessary for more knowledge regarding the UX of the academic lecturing staff when using an LMS to facilitate online courses. This theoretical contribution of a framework for representing the UX of academic lecturing staff in the use of an LMS begins to fill a gap in the literature. The practical contribution of the research lies in the potential of the resulting framework to inform cognisance of the influential circumstances and factors that have an impact on the UX of academic lecturing staff when using LMSs. This new knowledge could inform the professional development initiatives that would enable and support the academic lecturing staff to improve the utilisation of the technology for delivery and facilitation of online courses through the use of an LMS. In addition it could provide input to the Sakai development team to be of assistance with the enhancement of the UX for academics that use the LMS.

The findings and the application thereof should be of interest to developers of LMSs and to institutions in support and training of academics that have to use the LMS.

1.10 The Structure of the Study

Chapter 1 is an overview of the research problem and the purpose of the research. It outlines the intentions of the study, presents the research questions, the rationale for the study, the methods used and the scope of the study.

Chapter 2 is a literature review of UX and how it relates to the context of this study. The chapter gives a view of UX with the mentioning of different viewpoints on experience and UX. It also relates UX to the discipline of HCI. Identifying the components of UX contributes to answering sub research question 1. Factors that could influence the UX of the academic lecturing staff when using an LMS to facilitate online courses were explored to be incorporated in the draft conceptual framework.

In Chapter 3, the draft conceptual framework that was derived from the literature was validated by expert reviewers to present a conceptual framework towards answering sub research question 2.

Chapter 4 sets out the design and methodology for the research which assist with the answering of all the research questions.

Chapter 5 presents the data collected through respondents completing a questionnaire that included closed questions and an open ended question. The results of the independent data analysis are subsequently presented in order to answer the sub research question 2.

In Chapter 6 the data is integrated into the conceptual framework so that the revised conceptual framework represents the UX of academic lecturing staff in the use of an LMS tool in an ODL institution which provides the answer to the main research question.

Chapter 7 provides a summary, conclusion to the study and recommendations.

The structure for the narrative of the study is presented in Figure 1.2. The schematic explanation of the research design was used as a "road map" throughout the dissertation (in the beginning of Chapters 2 – 6).

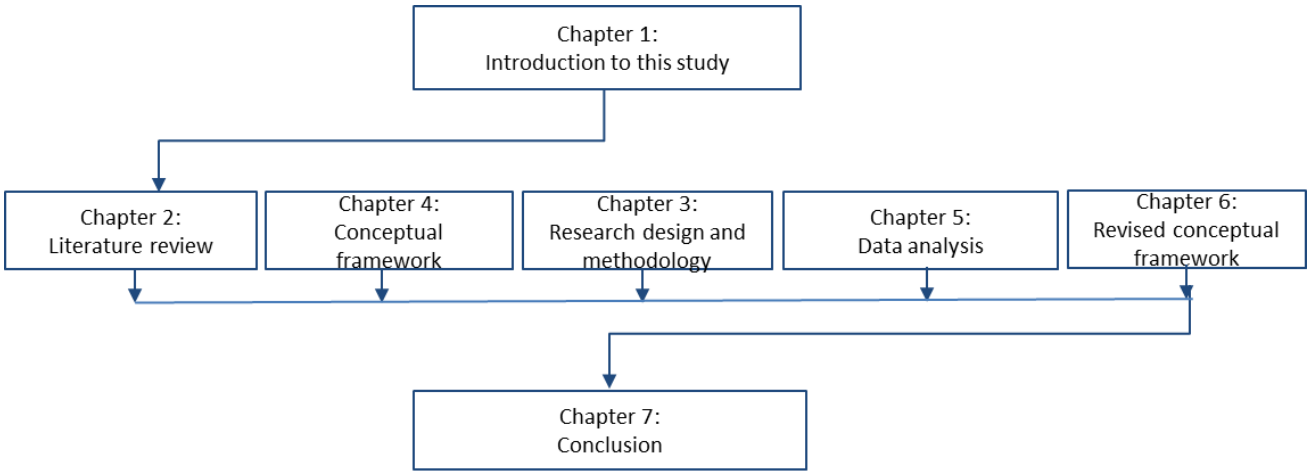


Figure 1.2: The structure of the study

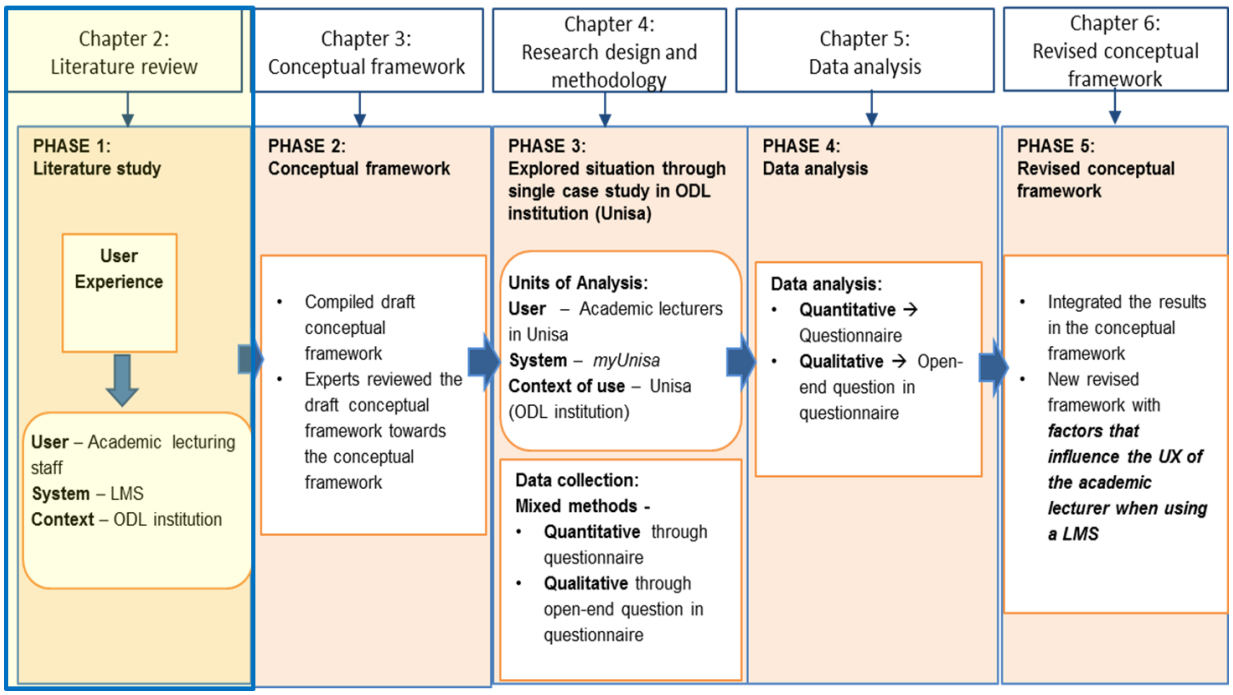
1.11 Summary

Chapter 1 introduced arguments towards the investigation of the UX of academics when using an LMS to facilitate online learning in an academic institution, and to identify those factors that may hinder the optimum use of these technologies. The study was outlined against the evolution of higher education and the increasing pressure to provide additional channels of interaction through the use of e-learning systems. Although the focus of most of the literature is on the students and their learning activities, this study is aimed at exploring the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution.

In the following chapter, Chapter 2, the notion of UX is engaged through an investigation of the components and factors that will influence the UX when using the LMS in an ODL institution.

CHAPTER 2: LITERATURE REVIEW

CHAPTER CONTENT:



Structurally this chapter fits into this research report as indicated in the above figure. This chapter is part of Phase 1 of the research and documents the literature study undertaken with the aim of contextualising the research and answering sub research question 1: What are the components of the UX when using an LMS?

The references were managed electronically with the Mendeley® citation manager. As recommended by the supervisors and for consistency, the Harvard method of referencing was used throughout this dissertation.

2.1 Introduction to User Experience

The terms "experience" and "user experience" are used in various ways in the literature. This research explored the notion of a user's experience when interacting with an interactive product, in this case an LMS. By means of this approach, the researcher intended to investigate the components and factors that could influence the UX when using the LMS in an ODL institution.

The focus of this investigation is on the experiential qualities of technology use and not on the product or system itself (Bargas-Avila & Hornbæk, 2011). Hassenzahl (2008:2) defines UX as a "momentary, primarily evaluative feeling (good-bad) while interacting with a product or service". The interest in this research is in relationships between people and interactive technologies. Interactions with technology can involve emotions, values, ideals, intentions and strong feelings, and "emotion affects how we plan to interact with products, how we actually interact with products, and the perceptions and outcomes that surround those interactions" (Forlizzi & Battarbee 2004:264). This research investigates and attempts to find the reasons behind certain experiences in this regard (Roto, Law, Vermeeren & Hoonhout 2010).

UX is part of HCI and this will be elucidated in the following sections. In section 2.2 the term *user experience* is explained with consideration of its relationship with *experience* and *usability*. (The relationship between UX and usability has to be clarified as viewed in this research and is explained in section 2.2.3). In section 2.3 the components of UX are specified in order to answer the first sub research question. In section 2.4 these components are expanded to encompass the scenario of this research, namely the academic as the *user*, the Sakai LMS as the *system* and Unisa as the *context of use*. Some techniques that are applied for the evaluation of UX are discussed in section 2.5. The chapter is concluded in section 2.6.

The visual outlay of the literature review is depicted in Figure 2.1.

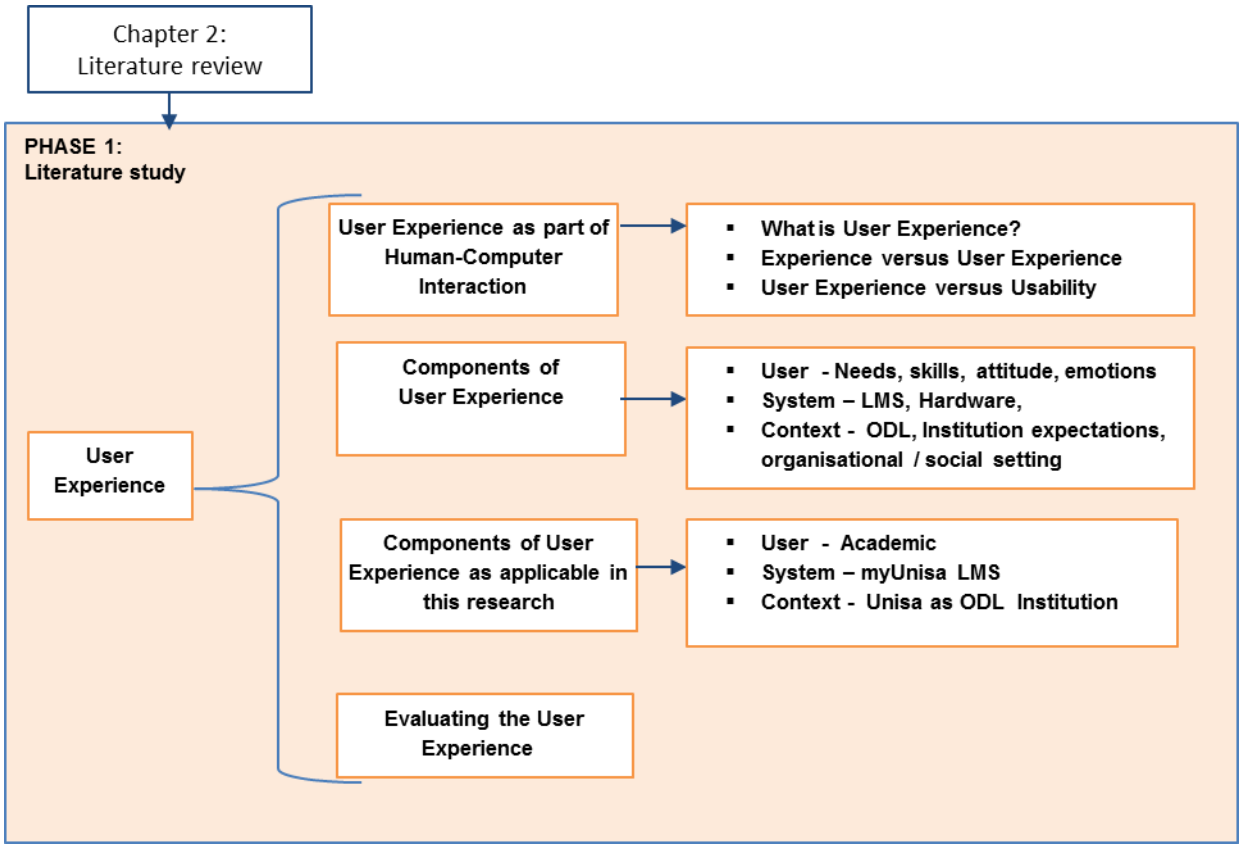


Figure 2.1: Outlay of the literature review

2.2 User Experience as part of Human-Computer Interaction

This section enlightens the interpretation of UX as part of HCI in the context of this study. Section 2.2.1 explains the concept of UX, section 2.2.2 differentiates between the different terms of experience and UX and section 2.2.3 distinguishes between the terms usability and UX.

2.2.1 What is User Experience?

UX evolved in the last decade as a popular topic that elaborated on the concept of usability in the area of HCI. The definition of UX in the ISO FDIS 9241-210 is: "A person's perceptions and responses that result from the use and/or anticipated use of a product, system or service" (FDIS, 2009).

UX considers non-utilitarian aspects of interactions, including user affect, sensation, and the meaning, as well as value of such interactions in everyday life (Forlizzi & Battarbee, 2004; Hassenzahl, 2008; Law et al., 2009). The key concern here is the human needs and emotional experiences as a consequence of the interaction with the product or system. "The true value of a product is related to the outcome of interaction (the end) and not the interaction itself (means to an end)" (Roto, Rantavuo & Kaisa, 2009:1). Hassenzahl and Platz (2000) distinguished between

pragmatic quality (the usability of the product, which addresses the underlying human need for security and control) and hedonic quality, which refers to quality dimensions with no obvious relation to task-related goals such as originality and innovativeness. According to Helander and Tham (2003:1272) “It is a different perspective: It is not how to evaluate the user; it is how the user evaluates”. The current study explores the UX of the academic lecturing staff when they facilitate courses in an online environment and hence will focus on task oriented goals rather than entertainment. As stated in the research from Isleifsdottir and Larusdottir (2008), the pragmatic qualities are important when using task oriented software.

A survey on UX has been done by Law, Roto and Hassenzahl (2009) who gathered the views of 275 researchers and practitioners from academia and industry. Most of these respondents agreed that UX is dynamic, context-dependent, and subjective, and that UX emerges when interacting with a product, system, service or an object. The UX could change, inter alia by depending on the individual user, use situations, the system and environmental factors (Karapanos, 2010). Consequently McCarthy and Wright (2004) and Law (2011) argue that the main task of studies in UX should focus on the user’s emotions, identity and values.

In general, UX explains how people feel about a product and their pleasure and satisfaction when using it or interacting with it. Important aspects of the UX are its usability, functionality, aesthetics, content, look and feel, and its sensual and emotional appeal (Rogers, Sharp & Preece, 2011). UX relates to the functional, the positive and the experiential and emotional aspects (Hassenzahl & Tractinsky, 2006). This research supports the viewpoint as specified by Zaharias and Mehlenbacher (2012) that UX is a dynamic process that involves traditional HCI usability and accessibility, together with the qualities of hedonic and affective design as proposed by Hassenzahl and Tractinsky (2006). In the milieu of HCI, the UX is every aspect subsequent to the interaction between an object or system and a person within a certain context of use. This implies that contextual factors also have an effect on the experience (Hassenzahl, 2003; Wigelius & Väätäjä, 2009; Obrist, Tscheligi, de Ruyter & Schmidt, 2010).

As reasoned by a group of UX specialists (Roto et al., 2010) UX can be viewed from different perspectives, namely - UX as a phenomenon, UX as a field of study and UX as a practice. These perspectives are set out in Table 2.1.

Table 2.1: Different perspectives of UX (Roto et al., 2011)

Perspective	Description
UX as a phenomenon	Describing what UX is and what it is not. Identifying the different types of UX. Explaining the circumstances and consequences of UX.
UX as a field of study	Studying the phenomenon, namely how experiences are formed or what a person experiences i.e. present, past or future (expectance) of UX. Finding the means to design systems that enable particular UX. Investigating and developing UX design and assessment methods.
UX as a practice	Envisioning UX, for example as part of a design practice. Representing UX, for example building a prototype to demonstrate the desired UX to others. Evaluating UX. Delivering designs to enable UX.

The current study entails an instance of all three perspectives, by investigating the UX as a -

- *phenomenon* through the literature;
- *field of study* to find out what components and factors influence the UX of academic facilitators when using the LMS in an ODL institution to facilitate online courses; and
- *practice* that evaluates the UX of the academic lecturer through the lens of the identified components and factors to document their personal UXs towards providing insights in the phenomena and an enhanced UX.

In the following section the different viewpoints and ways in which the terms *experience* and *UX* are discussed as they are referred to in literature.

2.2.2 Experience versus User Experience

In earlier research undertaken by Forlizzi and Ford (2000:419) reference is made to the general term *experience* as “the constant stream that happens during moments of consciousness”. The authors explain the *influences* on experience in reference to the user-product interaction as depicted in Figure 2.2.

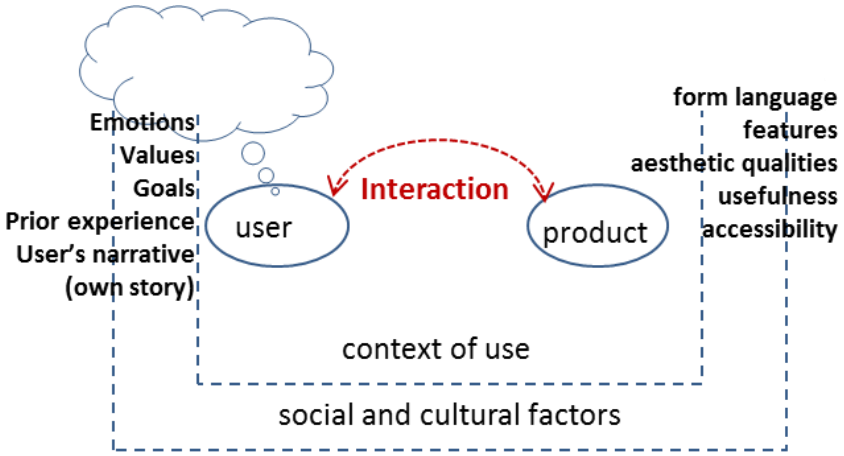


Figure 2.2: Influences on experience (modified from Forlizzi & Ford, 2000)

As illustrated in Figure 2.2, the *user*s bring along to the interaction their prior experiences, emotions, feelings, values, cognitive models and interpretation. The *product* represents how the artefact influences experience. Each product has attributes, for example features, aesthetic qualities and accessibility. These user-product interactions happen in a context of use which is influenced by social and organisational factors. Forlizzi and Ford (2000) distinguish between *experience*, *an experience* and *experience as a story*, although their explanation is corresponding to the description of *UX,* namely experience of the user when interacting with a product in a certain context of use.

Later research from Forlizzi and Battarbee (2004) refers to the different types of experiences as *experience*, an *experience* and *co-experience* (See Table 2.2). They explain that the *experience* is something that is typical of everyday life and happens constantly, such as typing a short message (sms) on a cell phone or drive to work. *An Experience* has more of an emotional impact and has a beginning and an end, for example watching a movie. *Co-experience* is taking place in the social context as people's experiences have an impact on each other's experiences. Interpretations and activities of individuals are influenced by others in the same physical or virtual space, such as participating in an internet game with others or taking part in a discussion in a webinar.

Table 2.2: Types of experience (Forlizzi & Battarbee, 2004)

Types of Experience	Description
Experience	Constant stream of "self-talk" that happens when we interact with products
An Experience	Can be articulated or named; has a beginning and end; inspires behavioural and emotional change
Co-Experience	Creating meaning and emotion together through product use

Later, a group of HCI experts (Roto et al., 2010) agreed on three different perspectives of UX, namely *experiencing*, *a user experience* and *co-experience,* as shown in Table 2.3.

Table 2.3: Different perspectives of UX (Roto et al., 2010)

Types of Experience	Description	Example
Experiencing	An individual's perceptions, interpretations of those perceptions, and resulting emotions during an encounter with a system.	Evaluation of experiencing could focus on how a single person experiences the encounter with an electronic game from moment to moment.
A user experience	How people have experienced a system over a period with a beginning and end. This view emphasizes the outcome and memories of an experience rather than its dynamic nature. It does not specifically emphasize its individual nature because 'a user experience' can refer to either an individual or a group of people encountering a system together.	Evaluation here could focus on methods that can provide an overall measure for the experience of a certain activity or system use (for example, a retrospective questionnaire method).
Co-experience	Focus on socially constructed experiences, namely 'shared experience' and 'group experience' refer to situations in where people are experiencing a situation together.	Discussion groups, forums

Desmet and Hekkert (2007) refer to *product experience* as all the affects as a consequence of interaction between a user and a product. This includes the aesthetic experience, experience of meaning and emotional experience. These experiences are also influenced by the user's characteristics, the attributes of the product and by the context in which the interaction takes place.

The mutual factor in the above mentioned descriptions of experience is that emotion affects how people experience products or interacts with technology.

2.2.3 User Experience versus Usability

In HCI usability is an established concept and focuses on user cognition and user performances during execution of tasks and interacting with technology. Usability emphasises task efficiency and how effectively the task is being done. This efficiency and effectiveness will then consequently influence the user satisfaction. The definition of usability is stated in the ISO FDIS 9241-210 as the - "extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" (International Organization for Standardization, 1998). As early as 1987 Whiteside and Wixon stated that primary usability is also in the experience of the user, which is beauty, hedonic, affective or experiential aspects of technology use. The traditional space of HCI has thus been extended from "beyond the instrumental to the holistic, aesthetic and hedonic" (Botha, Herselman & van Greunen, 2010:31). Traditional HCI or usability is perceived as mostly having an instrumental, task-oriented view of interactive systems or products (Bargas-Avila & Hornbæk, 2012). Evaluation of such software judges

whether the system operates accurately and rapidly and whether it is easy and satisfying to use. The focus is thus primarily on usability criteria such as effectiveness, efficiency, learnability, utility, flexibility, safety and robustness, which correspond roughly to usability goals (Nielsen, 2005) or pragmatic quality (McCarthy & Wright, 2004). Usability is generally considered as the concept that involves ease of use, usefulness, and user satisfaction (Preece, Rogers & Sharp, 2002). These approaches have extended to involve the user's subjective reactions, also including emotional aspects - which is now recognised as the user's experience (Laugwitz, Held & Schrepp, 2008; Vermeeren et al., 2010). Consequently usability is an attribute or evaluation of the product, while UX focus on the user and is thus a personal, subjective feeling about the product (Roto, 2007).

UX signifies an extended way of understanding and studying the use of interactive products. UX researchers argue that usability research is more focused on enhancing task efficiency and removing problems in the user interface (Preece, Rogers & Sharp, 2002). UX comprises the subjective aspects of usability as it is mainly dependent on the user's *perception* of the effectiveness and efficiency of the system and the users own opinion of how they succeeded in reaching the goal (Roto, 2007). It extends usability by addition of hedonic qualities of use and focuses on more than just the completion of tasks. Hedonic qualities involve aesthetics, fun and identification/autonomy that people experience during interaction. UX is dynamic, context-dependent and subjective and it emerges from interacting with technology (Hassenzahl, 2008; Law et al., 2009).

Bargas-Avila and Hornbæk (2012) did a study to explore differences between UX and usability research done previously. They found that UX topics of research tend to be consumer products (such as mobile phones and apps) with the contexts usually of leisure (64%), while work related topics were considerable less (36%). Although that study concluded that UX research generally focuses on consumer products, in contrast to this, the focus of this study is on a work-related, task-oriented system.

Flowing from these arguments, the following question could be asked: How does UX complement the usability concept? There has been much debate regarding the relationship between UX and usability. The following three general viewpoints regarding the relationship between usability and UX (also depicted in Figure 2.3) are being considered:

- Usability is a factor in the UX. The usability is thus included in UX (Preece, Rogers & Sharp, 2002) – See View 1 in Figure 2.3.
- UX is seen as the *user satisfaction* subjective component in usability. UX is thus a factor in usability (Bevan, 2009) - See View 2 in Figure 2.3.

- UX and usability are separate, but closely-related concepts. These concepts can interconnect with common attributes, but there are differences in their characteristics (Moczarny, de Villers & van Biljon, 2012) - See View 3 in Figure 2.3.

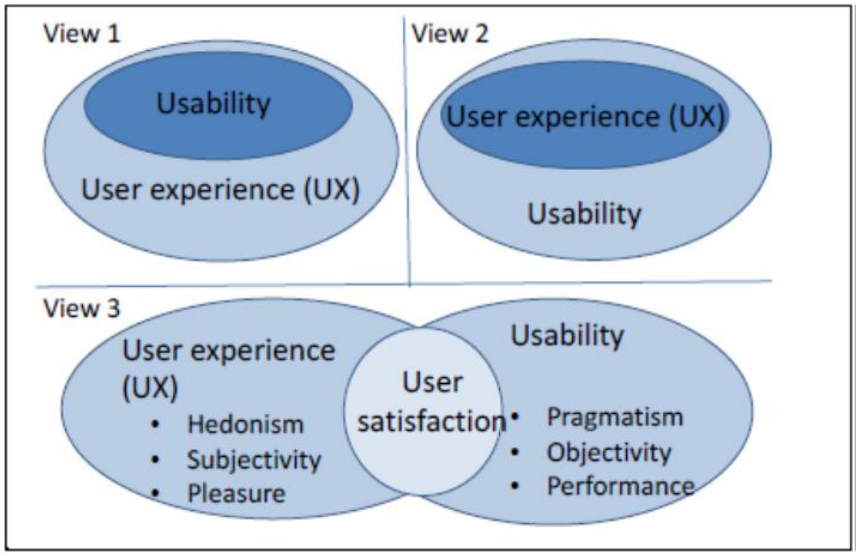


Figure 2.3: Different views of UX and usability (Moczarny et al., 2012)

The current study will apply the more holistic view where UX subsume usability as illustrated in View 1 in Figure 2.3 and as also supported by Vermeeren et al. (2010). This stance comprises that the perceived usability has to be taken in consideration when evaluating the UX. While usability is mainly about the system and the user interaction, the primary components that are acknowledged by several researchers to influence the UX are the *user*; the *system* and the *context of use* (Hassenzahl & Tractinsky, 2006; Roto et al., 2010). These proposed components will now be explored in sections 2.3 and 2.4.

2.3 Components of User Experience

Several viewpoints on UX which were found in literature will now be discussed.

Jordan (2002) proposed a fixed hierarchy structure of qualities that influences experience with a product. According to this structure the engagement with a product occurs at three levels, namely functionality, usability and pleasure. As illustrated in Figure 2.4, the product (or system) first has to meet the functionality (usefulness), and then usability (ease of use) before pleasure (hedonic needs) becomes important.

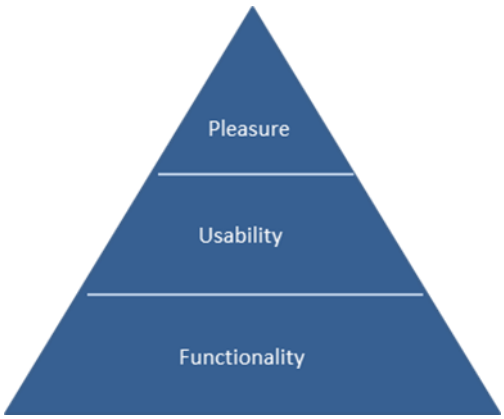


Figure 2.4: Jordan's fixed hierarchy of user needs (Jordan, 2002)

Karapanos, Hassenzahl and Martens (2008) state that the user's values, the type of product or system, and the systematic change of UX over time, play an important role in UX (See Figure 2.5). The individual's standards and needs will influence the interaction with the product; the type of product or system will determine the way it will be used or interact with; and the circumstances (specific situation) will influence the interaction and experience. Lastly, the experience changes over time, for example perceptions of a product will probably differ between first time of use and after a period of using the same product – say six months.

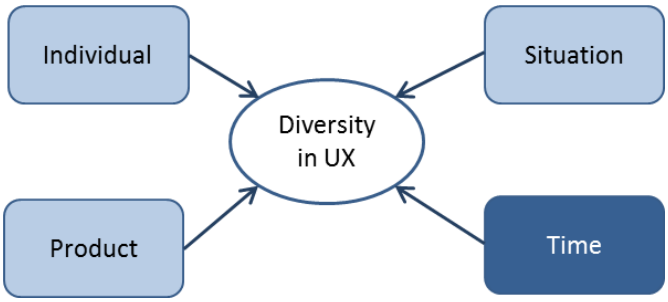


Figure 2.5: Four sources of diversity in UX (Karapanos et al., 2008)

Beauregard and Corriveau (2007) reiterate the above mentioned viewpoints, but add the psychological concepts that are essential for UX measurement. They propose a conceptual framework which includes the user, product and interaction between the product, user and the context of use. The importance of the user's cognitive behaviour (emotions, thoughts, attitudes, perceptions) is emphasised. The evaluation of the UX is accessible through self-reporting, behavioural observation and depiction of other cognitive processes. The conceptual framework is illustrated below in Figure 2.6.

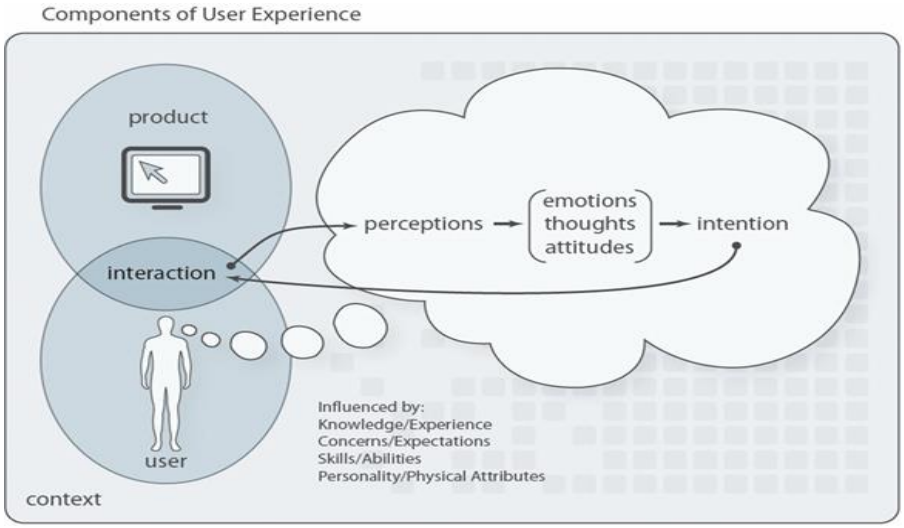


Figure 2.6: Conceptual framework as proposed by (Beauregard & Corriveau, 2007)

An integrated research approach to the experimental study of emotional user reactions in consideration of instrumental and non-instrumental quality perceptions of interactive systems to UX, has been proposed by Thüring and Mahlke (2007). They state, as illustrated in Figure 2.7, that the components of the UX as outcomes of the human technology interaction are the following: perception of instrumental qualities; emotional user reactions and perception of non-instrumental qualities.

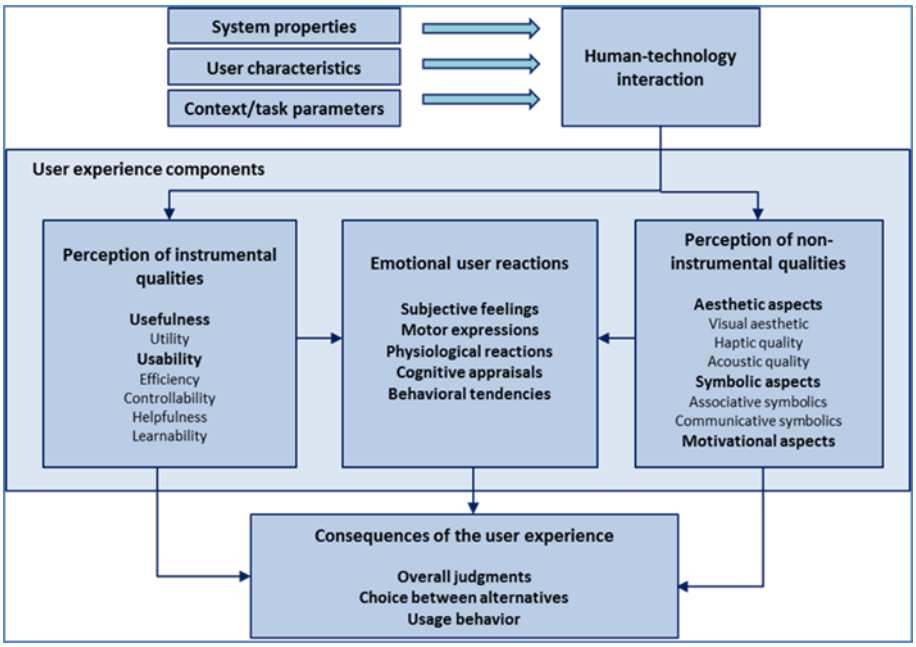


Figure 2.7: UX research framework (Thüring & Mahlke, 2007)

Interaction characteristics primarily depend on system properties, but user characteristics and context parameters can also play an important role. This framework defines emotional reactions as a component of the UX and not as a consequence. According to this perspective, cognitive and emotional aspects constitute the UX.

In all of the above mentioned research, the mutual components are the user, the system and the context. Supporting these viewpoints Hassenzahl and Tractinsky (2006) specified that UX is the consequence of interaction between three components, namely the *user*, the *system* and the *context* within which the interaction occurs (for example organisational/social setting, meaningfulness of the activity and voluntariness of use). This understanding of UX will be applied within this study. As such, the literature review for the current study highlights the elements of the components as the -

- the *user* with its predispositions, such as expectations, needs, motivation and mood;
- the *system* with inter alia the pragmatic quality, hedonic quality, usability and functionality; and
- the *context,* that is the technical, organisational, physical environment. This viewpoint as used in this study is illustrated in Figure 2.8.

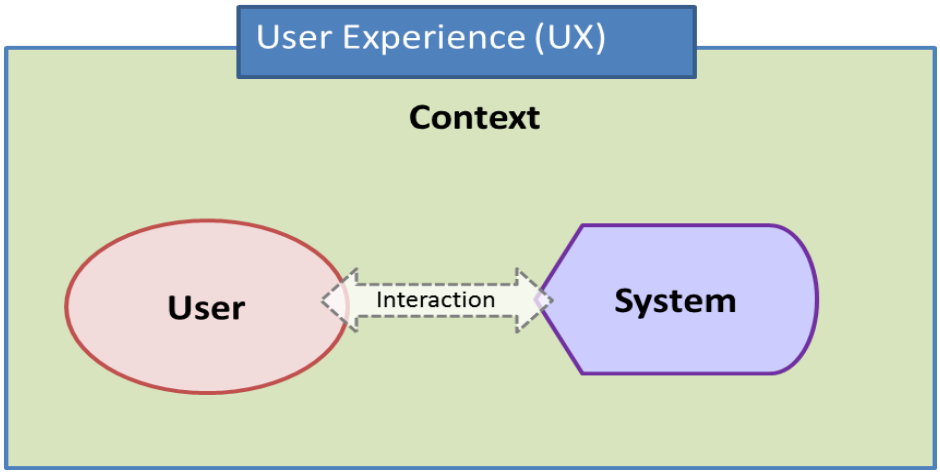


Figure 2.8: A schematic view of UX as in this study

These components of UX form the principal foundation of the research structure. Corresponding to this viewpoint Roto et al. (2010) explained the same concepts, but refer to it as *Factors affecting UX*. However, in this research it is indicated as the *components of UX*. These components, namely the *user*, the *system* and the *context of use*, were investigated in the literature study and are further described in the paragraphs that follow.

2.3.1 Component: User

The *user* is defined as a person interacting with or manipulating the system and she or he can be described as having the characteristics of needs, motivations, experiences, expectations, predispositions, mental state and resources (Roto, 2007; Roto et al., 2010). Norman (1988) stressed the necessity to fully explore the needs and desires of the users and the intended uses of the product. The following sections will explain the user as a component of UX. Section 2.3.1.1 explains the needs of the user of the system, section 2.3.1.2 discusses the skills of the user and section 2.3.1.3 confers inter alia the attitudes and acceptance towards the system. Lastly section 2.3.1.4 discusses the internal state or emotions of the user regarding the use of a system.

2.3.1.1 **Needs of the user**

In order to understand the user, the user's needs have to be identified where the system is used in the real context (Roto, 2007). These features could influence the user's satisfaction in the workplace and should be acknowledged because some of these features may motivate the user to be more encouraged to use the technology (Zhang et al., 1999). Herzberg's (1966) classic motivation-hygiene theory holds a viewpoint which reflects on users' needs and motivational factors that influence the use of technology in the workplace. These are factors such as challenging work, recognition, achievement and personal growth that give positive satisfaction. Herzberg (1966) found hygiene factors (e.g. status, job security and work conditions) to satisfy basic physiological, safety and social needs as determined earlier by Maslow (1943). These factors do not give positive satisfaction, though dissatisfaction results from their absence. The factors are external to the tasks itself, and include aspects such as company policies and supervisory practices. Zhang et al. (1999) propose that these motivational features will contribute to the user satisfaction and will, therefore encourage the use of the technology. Additional to this, classic needs theories (Maslow, 1943; Herzberg, 1966) suggest that people are motivated by internal needs together with process theories that elucidate cognitive processes used by people to motivate themselves and emphasize employee's perceptions and expectations of work. It was also found that positive attitudes toward information systems improved the use of the system (DeSantis, 1983; Zhang et al., 1999; Zhang & Li, 2004; Zhang, Li & Sun, 2006).

These factors could relate to the description of UX where the motivational factors are related to the user's needs (such as inter alia achievement, autonomy and challenges) and in addition the hygiene factors are related to the context (i.e. institutional policies and standards) (Tuch & HornbÆk, 2015).

UX goes beyond just measurement of usability, it also focuses on the user's true needs (Partala & Kallinen, 2012). Therefore, it has to be recognised what the needs and values of the user are in order to evaluate the product design (Väänänen-vainio-mattila, Hassenzahl, Landau, Fort, et al. 2008). The current study distinguishes between *pragmatic quality* (usefulness and ease of use of the system) and *hedonic quality* (e.g. originality, innovativeness). Pragmatic quality addresses the human need for control and security, where the hedonic quality could address the human need for novelty, change, challenge or social power (Hassenzahl et al., 2000; Partala & Kallinen, 2012). The user's perception (e.g. perceived usability) influences the use and behaviour when using the system (Hassenzahl & Tractinsky, 2006; Gamage, Tretiakov & Crump, 2011). Hassenzahl (2004) proposed that the "hedonic quality refers to the users' self; it relates to stimulation, i.e. the product's ability to stimulate and enable personal growth, and identification, i.e. the product's ability to address the need of expressing one's self through objects one owns" (Karapanos et al., 2010:2). Adjacent to this is the influence of perceived visual attractiveness that seems to be important for user satisfaction in research done by (Tractinsky, Katz & Ikar, 2000). Two of the factors that influence individuals' decisions to use technology as a tool for productive work are perceived usefulness and perceived ease of use (Salajan et al., 2011). This will consequently have an impact on the user's acceptance of the LMS (Al-Busaidi & Al-Shihi, 2010).

Since the academic lecturer certainly wants to produce effective facilitation through technology (Koehler & Mishra, 2009), this needs to translate into specific requirements for what content the product will support and what functionality the product will offer to the user (Gamage, Tretiakov & Crump, 2011; Garrett, 2011). In order to design or create an effective learning environment, the facilitator (academic) requires an analysis of the expected learning outcome, identification of the relevant support mechanisms and a choice of the appropriate instructional methodologies. The facilitator furthermore needs to have knowledge of the technology being used (Kizito, 2003).

Results from a study done by Hassenzahl (2008) indicated that a feeling of competence was the most significant psychological need, followed by autonomy and relatedness. Supported by Partala and Kallinen (2012) psychological needs indicated that feelings of autonomy, competence and high self-esteem seemed to correlate with the most satisfying experiences and missing in the unsatisfying experiences.

2.3.1.2 **Skills of the user**

Academic lecturing staff members often have insufficient expertise in integrating technologies into facilitation and instruction of the educational course material. Most academic lecturing staff members have limited technology integrated learning experiences, having never completed academic coursework that was facilitated through technology (Koehler & Mishra, 2009). Therefore, the inclusion of technology in pedagogy complicates teaching. Technology is ever-changing and difficult to master and academic lecturing staff members have to receive training and support in order to be innovative in their use of technology for facilitation of their coursework (Siritongthaworn, Krairit, Dimmitt & Paul, 2006; Panda & Mishra, 2007). In order to integrate the use of technology in their teaching, academic facilitators need to understand the complex interaction among three bodies of knowledge, namely *content* (subject matter), *pedagogics* (instruction and understanding how the student thinks and learns) and *technology* (Mishra & Koehler, 2006). It was on the bases of these three knowledge fundamentals that the TPACK framework has been proposed by Mishra & Koehler (2006) and they have extended the idea of Shulman's (1986) classic concept of "Pedagogical Content Knowledge" (PCK) by adding the descriptions of teachers' comprehension of educational technologies – hence the conception of Technological Pedagogical Content Knowledge (TPACK). TPACK is an understanding that progresses from interactions among content, pedagogy, and technology knowledge. The skill to construct teaching with the understanding of concepts using technologies; using pedagogical techniques to use technology effectively to teach content; knowledge of using technology to teach difficult concepts; knowledge of the target group's prior knowledge. The TPACK framework could support techniques to unravel the possible means of integration of knowledge through technology in education. This provides an alternative to the simplified way to use technology just as an *add-on*.

2.3.1.3 **Attitude, perceptions, expectations and acceptance of the user**

The facilitation tasks when using the LMS could be perceived, adopted and applied in different ways by academic lecturers.

a) Attitude

Attitudes of academic lecturing staff towards the LMS could influence adoption of ICT in teaching and learning. A study that was done by Albirini (2006) showed that the attitude of the facilitator was predicted by computer (technology) attributes, cultural perceptions and competency with the use of technology. The results showed that the facilitators' knowledge of technology and their experiences with it will influence their attitude towards technology. This reflexion is supported by a study that

has been done by Coetzee and Potgieter (2012) which indicated that academic lecturing staff have developed moderate positive attitudes towards the use of the LMS operational at Unisa. They found that negative attitudes were mostly because of inadequate training in the use of the LMS and because of the perception of staff that some disadvantaged students may be excluded from the online learning scenario.

b) Perceptions

As indicated by the definition in the ISO FDIS 9241-210, UX is associated with a person's perception that results from the use of a product, system or service (FDIS, 2009). Perceptions is a determining factor in how VLEs are adopted by academic lecturing staff facilitating coursework and thus how it will be used (Gamage, Tretiakov & Crump 2011).

Earlier research by Cant and Bothma (2011:121) revealed challenges regarding the use of the LMS. *P*redispositions like f*ear of the use of technolog*y, *limited understanding of technology,* and *lack* of p*ractical experience* to use the LMS, were among the several reasons that would decrease the use of the LMS. The results of their research showed that lecturers do not accept the LMS as a teaching tool. These results imply that some of the perceptions of the academic lecturing staff about the use of the LMS are: lack of support, lack of time, lack of trust and lack of confidence in technology. The researchers conclude that if academic lecturing staff are more informed and knowledgeable about the benefits when using the LMS for the facilitation of their coursework, they may be more willing to adapt to it (Cant & Bothma 2011).

c) Expectations

User's expectations have an impact on experiences and the outcome of technology use (Brown, Venkatesh & Goyal, 2012). According to a study done by Karapanos (2010) the expectations of the use of mobile technology have an influence on the acceptance of the technology. The actual experience related to opportunities for positive expectations or fears of negative experiences. There is a strong correlation being found between expectations, improved performance and satisfaction levels implications (Mahmood et al., 2000). The expectations are that the system has the functionality to help perform necessary tasks effectively and efficiently. If the performance of the technology would be on an acceptable level the expected consequence would be the use of the technology (Venkatesh & Davis, 2000; Brown, Venkatesh & Goyal, 2012). Their research disclosed that expectations and perceptions influence technology use significantly. It is essential to notice that high expectations and negative experiences could have a negative impact on the use of technology. The advice of Brown et al.'s (2012) in this regard is to set realistic expectations, since unmet

expectations could have negative consequences. It would be beneficial if the academic lecturers are well-informed about the use of the system, its affordances, its functionalities, and the system's constraints during the orientation and induction of staff. The reason is to realistically influence expectations so that subsequent constructive technology use would be more likely to happen.

d) Acceptance

The success of the utilization of the LMS begins with the facilitator's (or *user*'s) acceptance, which will influence the utilisation of the LMS as course delivery method (Davis & Wong, 2007). In order to investigate the user acceptance of certain technology, the Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw, 1989) has been used in education research, where it is claimed that user acceptance is a combination of the perceived usefulness and perceived ease of use (Taylor & Todd, 1995; Gibson, Harris & Colaric, 2008; Al-Busaidi & Al-Shihi, 2010). This influences the positive attitude toward the technology, intent to use the system and real use of the system. The acceptance of the system by the academic lecturers is essential so that it could be effectively utilised for the facilitation of online learning. "Technology must be suitable for the user, not the contrary: it is really effective when it is ergonomic, intuitive and transparent" (Cantoni et al. 2004:338).

2.3.1.4 Emotions of the user

Emotion is an essential part of life as it affects how we feel, how we behave and think; and has gained significant recognition in interaction design. Positive or negative feelings have a considerable impact on how users interact with technology (Khalid, 2006). Thinking entails emotions, and vice versa. For instance, thinking about struggling with technology may cause feelings of frustration, despair or excitement. Empirical studies in neuroscience have confirmed that cognition and emotions are unified and that both contribute equally to the control of thought (Rabins, 2003; Minsky & Singh, 2004).

The consequence of a user's internal state (e.g. predispositions, needs, motivations) affects the user's experience of something (Hassenzahl & Tractinsky, 2006; Law et al., 2009). The technology has to accommodate the teaching community's ideas of what they need (Laurillard, 2008). In general, academic lecturing staff "wants control over the process, not the uncritical adoption of others' products" (Laurillard 2008:144). They need to collaborate and share other academics resources, ideas and outputs, but also need their own innovation, adapting previous designs, exploring and experimenting. Norman (2004) suggests that how things (products and systems) look, tends to

evoke positive emotions in users. Accordingly, users form perceptions of a particular product (system) through usage where the performance level is dependent upon the ease of use and functionality. Subsequently the user reflects a level of meaning, in other words, the user maintains an innate sense of identity through the use of the system over time. The UX of a product may change over time. Early experiences seemed to relate mostly to hedonic aspects, but with continued use, the experiences tend to reflect how the product becomes more meaningful in life (Karapanos et al., 2009).

Hellman and Rönkkö (2008) stated that the hedonic side of UX is about the user's experience of pleasure and excitement and the pragmatic side is about the user's expectations of a product's functionality, ease-of-use etc. Products (or systems) have to support the user needs in order to motivate the user to utilise the system's affordances.

2.3.2 Component: System

System is defined as the structure required for the product under examination to work or to be useful (Roto, 2007). This includes the characteristics of the system e.g. complexity, purpose, usability, functionality (Hassenzahl & Tractinsky, 2006). Accordingly, in section 2.3.2.1, this study will examine the LMS as the system, section 2.3.2.2 enlightens the pragmatic quality of the system, section 2.3.2.3 explains the pedagogical appropriateness of the system and section 2.3.2.4 discusses the hedonic quality of the system.

2.3.2.1 **Learning Management System**

An LMS is an e-learning application which is a functional tool for distance-learning to use for information delivery, i.e. teaching and learning, and managing educational content. The most important advantages of an LMS are improving the quality of the learning experience, increasing the availability and accessibility of learning materials, supporting collaborative activities and forming connections and channels communication in the education community (Georgouli, Skalkidis & Guerreiro, 2008; Badawood & Steenkamp, 2013).

Research undertaken by Cant and Bothma (2011) in a case study, concluded that an LMS is the most appropriate technology to use for teaching and learning in an ODL institution. However, the research revealed that lecturers do not effectively use the LMS in their teaching activities. Subsequent research has to be done to find out how this situation could be turned around. Although an LMS could provide the functionality for designing and managing learning activities for individual tasks and

group collaboration, the LMS needs to be uncomplicated and designed to support learning principles and also support lecturers to manage the course site (Vrasidas, 2004).

There are numerous commercially or open source LMS tools available. However, most of these studies refer to the student's experience of usability and not as experienced by the lecturer or facilitator (Lewis, Macentee, Delacruz et.al., 2005; Orfanou, Tselios & Katsanos, 2015).

2.3.2.2 **Pragmatic quality: The usability of the system**

Usability has been expressed in terms of the effectiveness, efficiency and satisfaction of the users who performed specified tasks (ISO, 1998). Pragmatic quality of a product or system is connected to the users' need to achieve behavioural goals (Hassenzahl, 2004). The objective measures, i.e. effectiveness and efficiency, are measured by conducting tests to measure the time, number of errors and completion rate on specified tasks. These measures are primarily about pragmatic quality or achievement of task goals (Townsend & Sood, 2012). The subjective measure, namely user satisfaction, is usually measured with post-test questionnaires and is primarily about the perception and experience of the user regarding the effectiveness and efficiency of the system.

According to the ISO 9241-11 (1998) *usability* is defined as: "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use".

The new ISO standard ISO/IEC CD 25010.2 (2008) proposes a more inclusive breakdown of quality in use into *usability in use* (which corresponds with the ISO 9241-11 (International Organization for Standardization, 1998) definition of usability as effectiveness, efficiency and satisfaction); *flexibility in use* (which is a measure of the extent to which the system is usable in all potential contexts of use, including accessibility); and safety (which is concerned with minimizing undesirable consequences when using the system). In this study the consideration of the pragmatic quality is mainly regarding the usability in use and the flexibility in use. This study does not extend to usability testing of the LMS, but incorporates usability in use as experienced by the academic lecturers.

Pragmatic quality refers to a perception of a system's potential to support the accomplishment of certain goals (Hassenzahl, Diefenbach & Göritz, 2010). There are differences between experiences, which relate to the concept that experience differ according to the specific situation. When the LMS is used as a tool to facilitate online learning it could be accepted that it is goal oriented and the aim of the lecturer is to complete the task as effectively and efficiently as possible.

Reliable functioning of the hardware and software has an impact on the usability (or pragmatic quality). It is been referred to in some research as the technical quality which refers to the technical performance and basic functioning of the system (Tuch & HornbÆk, 2015). It was found that the stability, reliability and availability of network and power supply will have an influence on the UX (Botha, Herselman & Van Greunen, 2010). Access to hardware such as laptops, online sites and computers may to some extent be an obstacle to the use of digital technology use (Starkey, 2010).

2.3.2.3 **The pedagogical appropriateness of the system**

The LMS should accommodate learning activities in a way that it can be shared, reused and customised (Laurillard, 2008). It is argued that LMSs are not always fully utilised, but rather misused to deposit static study material online without applying the pedagogical principles for online teaching and learning (Vrasidas, 2004). According to a study that was done by Emelyanova and Voronina (2014:286) at a Russian University, lecturers "seem to either overestimate or underestimate the rigour and objectivity of a learning management system". In another case study done by Georgouli, Skalkidis and Guerreiro (2008) where the adoption of an LMS was investigated, it became clear that the technology tools cannot be exploited to reach their full potential if lecturers were unwilling to adapt to a different teaching style, based on technology. The potential of the LMS can only be reached if lecturers are knowledgeable in developing their pedagogical autonomy and to become proficient in the use of technical tools, to be able to experiment and to discover the need for a new pedagogy in university teaching. The ability to use the software effectively and confidently could become possible after training. The way in which the affordances of the LMS are perceived, predicts facilitation of online courses and the way the LMS is effectively and efficiently utilised (Rubin, Fernandes & Avgerinou, 2013).

The selection of an LMS by a Higher Education institution is often the result of the analysis of technical features, available functions and learning technology standards compliance (e.g. SCORM). These analysis and choices are mostly system-oriented and not user-oriented (Inversini, Botturi & Triacca, 2006). However, enhanced usability of the LMS environment could lead to reduced time devoted to development and facilitation of online courses and the improvement of students' learning experiences. The academic lecturers could then rather focus on content and not on the intricacies of the technology.

2.3.2.4 **Hedonic quality: Pleasure and attractiveness**

Hassenzahl (2004) reasoned that pragmatic quality refers to the product's ability to support the achievement of behavioural goals, but in contrast to that, the hedonic attributes are mostly related to the users' self. The current study considers the hedonic quality of the system. That is for instance, how the system affords the user with the experience of joy and pleasure. It refers to the system's hedonic quality, which in a particular situation leads to consequences such as emotions of satisfaction or excitement (Hassenzahl, 2004; Diefenbach, Kolb & Hassenzahl, 2014). A system can be perceived as hedonic because it "provides stimulation by its challenging and novel character or identification by communicating important personal values to relevant others" (Hassenzahl 2004:322). According to several research papers it is also strongly related to the user's identification and self-expression through the use of the system (Diefenbach, Kolb & Hassenzahl, 2014). The concept of hedonic quality enables a better understanding of the system attributes related to positive experience. The cognisance of the human experience allowed better predictive influence of attitude, motivation, preference and acceptance of technology (Hassenzahl, 2004; Hassenzahl, Diefenbach & Göritz, 2010).

The hedonic qualities of a system have an influence on the emotions of the user and contribute to forming of judgement and engagement with the system (Bevan, 2009). "*We become what we behold. We shape our tools, and thereafter our tools shape us*" (McLuhan 1965:9).

2.3.3 Component: Context

A product (or system) is used in a certain context, by a particular target group with certain characteristics. The user performs certain tasks in order to achieve specific goals in a specific context. The product (or system) is used within a specific range of technical, physical and social or organisational environments that may influence its use (Maguire, 2001a). According to the ISO 9241 standard Part 11 - Guidance on Usability (International Organization for Standardization, 1998) the context of use consists of the "tasks and equipment (hardware, software and materials), and the physical and social environments in which a product is used."

Context of use influences the interaction between users and systems. Context refers to the circumstances under which the activity takes place (Maguire, 2001a; Roto, 2007). Jumisko-Pyykkö and Vainio (2010) analysed existing models related to contexts of use, and divided use contexts into five main classes: *physical context* (e.g. spatial location, functional place and space, and sensed environmental attributes); *temporal context* (e.g. duration of interaction, and time); *task context* (e.g. multitasking, interruptions); *social context* (e.g. the effects of other persons present and the

related interpersonal interactions) and the *technical* and *information* context (e.g. other systems and services and their interrelations). As illustrated in Table 2.4, Maguire (2001a) has defined context of use in usability activities with the following aspects and different contextual factors: user goals and characteristics; tasks; technical environment; physical environment and social or organisational environment. Taking into account that this study acknowledges the components of UX to be the *user*, *system* and *context*, it attends to the user goals and characteristics in the *user* component. Consequently the study reflects on the physical environment, technical environment, tasks and social or organisational environment as the *context* component.

Table 2.4: Contextual factors (Maguire, 2001a)

ENVIRONMENT		
Technical Environment Hardware Software Network Reference materials Other equipment	**Physical Environment** **Workplace conditions** Atmospheric conditions Auditory environment Thermal environment Visual environment Environmental instability **Workplace design** Space and furniture User posture Location **Workplace safety** Health hazards Protective clothing & equipment	**Organisational Environment Structure** Group working Work practices Assistance Interruptions Management structure Communications structure Remuneration **Attitudes & Culture** Policy on use of computers Organisational aims Industrial relations **Job design** Job functions Hours of work Job flexibility Performance monitoring Performance feedback Pacing/Autonomy/Discretion

The context, as a component of UX is discussed in the following sub-sections. Section 2.3.3.1 explains what an ODL environment implies, section 2.3.3.2 examines the institutional expectations and demands of the ODL institution, section 2.3.3.3 explains the organisational and/or social setting, which is in this study the academic community and section 2.3.3.4 discusses the training and support structure.

2.3.3.1 **Open Distance Learning**

The ODL University, the institution where the LMS is utilised, plays a significant part in the technical and information context. The term ODL, represents the multi-dimensional concept aimed at "bridging the time, geographical, economic, social, educational and communication distance between student and institution, student and academic staff, student and courseware and student and peers. ODL focuses on removing barriers to access learning, flexibility of learning provision, student-centeredness, supporting students and constructing learning programmes with the expectation that students can succeed" (Unisa, 2008:2).

2.3.3.2 **Institutional expectations and demands**

According to the Unisa Institutional Operational Plan 2012 – 2013 (Unisa Operational Plan, 2013), the transformation program routes Unisa towards a new business model, which promotes technology advancements in the attempt to improve ODL principles. Two of the goals that were identified in the Operational Plan are to -

- promote service efficiency and effectiveness in the institution towards being a recognised student-centred organisation; and
- establish a people-centred university by enhancing capabilities and capacities and advancing cultural transformation (Unisa Operational Plan, 2013).

Some of the strategies decided on to achieve these goals are to -

- implement technology-enhanced assessment practices;
- promote the adoption and use of technology in teaching, learning, research and community engagement; and
- have more or less 600 staff members educated and trained in the use and adoption of approved technologies in teaching and learning, VLEs, blended learning and online learning (Unisa Operational Plan, 2013)**.**

In order to achieve this technology integration, the University will have to provide the relevant professional development programs to support academic lecturers to experiment with new educational technologies (Kyei-Blankson, Keengwe & Blankson, 2009)**.** The lecturers need the knowledge and support to use multimedia effectively and to integrate it with the LMS, in order to improve the student learning in the context of distance education. Interactive multimedia (including audio, video, graphics, animation, etc.) can be effectively integrated to enhance instructional delivery and learner support (Dikshit, Garg & Panda, 2013)**.**

A support structure to allow for development and training in the ODL institution is necessary to respond to the academic community's specific needs. The academic lecturer needs to have a multi-dimensional and holistic ICT knowledge for choosing adjustable teaching strategies. The mindfulness of students' special needs and engagement to accommodate the students, would enhance both student engagement and teacher abilities regarding the use of the LMS (Dias & Diniz, 2012). It would be advisable to offer academic lecturers personalised and flexible training opportunities which could enable them to develop and compile their own e-learning solutions (Doherty & Honey, 2006).

2.3.3.3 **Organisational and social setting**

Laurillard (2008) includes all research academia and lecturing staff by using the collective name of the *teaching community*. The use of the word *community* conveys the consciousness of collaboration across disciplines and sectors. It is time-consuming to be innovative and *re-invent the wheel* in effective use of technology in education. The author argues that progress will be faster if research academia and lecturing staff can share knowledge, learn from each other and collaborate to find the best ways to deliver quality courseware (Laurillard, 2008). Towards extending this idea, Bennett and Santy (2009) recommend that users of a particular VLE could gain knowledge by moving outside the boundaries of their own community by exploring different e-learning tools from other communities to develop knowledge and better understanding of online teaching practice**.**

2.3.3.4 **Technical and instructional resources**

Technical support, provided by the institution, is essential for users to be able to effectively utilise the LMS. Research has shown that ineffective maintance strategies and inadequate technical support could cause under-utilisation of the LMS (Ssekakubo, Suleman & Marsden, 2011). The institution should provide technical support since it has been found that it positively influences academic lecturers' use of technology and thus the integration of ICT in blended learning (Welsh, Wanberg, Brown & Simmering, 2003; Moses, Khambari, Nida, Wong, 2008). The technology resources (e.g. podcasts, video, multimedia, Open Educational Resources) should be available to academic lecturers to explore new technology approaches (Garrote Jurado & Pettersson, 2007). Support should be provided for the preparation of the multimedia material, that is inter alia, equipment and assistance to create or obtain the technology in order to provide the lecturers access to podcasts of lectures, audio, simulations to demonstrate difficult concepts (Ardito et al., 2006). The creation and use of multimedia could stimulate and motivate better utilisation of the LMS (Wiley & Green, 2012). Additional to the technical resources the academic lecturers could need the assistance

from instructional technology consultants to advise on best practices for the discipline (course) being facilitated through the LMS (Kyei-blankson, 2010).

2.4 Components of User Experience as Applicable in this Research

This section builds on the previous overview in section 2.3, by applying the identified components user, system and context (Hassenzahl & Tractinsky, 2006) to the generalities of the case under scrutiny, that is the ODL institution.

2.4.1 User: The Academic as the User of the LMS

University academics are considered highly educated individuals, usually having substantial autonomy and who mostly work in an environment of deliberation (Gibson, Harris & Colaric, 2008). The emphasis of ODL is on the student as a learner, but the academic lecturer plays a central role in the creation and facilitation of the educational process. Lecturers sometimes reflect reluctance regarding the use of the LMS because of technological problems and additional time having to be spent on facilitation of online teaching (Gibson, Harris & Colaric, 2008; Cant & Bothma, 2011). The quality and usability, in the form of the technical usability of the system, as well as the pedagogical usability, will influence the student's VLE can be complex. Therefore, the ideal would be to include multimedia experts, programmers and instructional designers in the development team. Nevertheless, in most instances the academic lecturer needs to be able to fulfil all these roles (McInnis, 2002).

The academic lecturers more often than not have to do their own instructional design with the cognizance of an effective pedagogical model. In order to transform original print-based courses into e-learning courses, the lecturer would need to know how the tools provided by the LMS could be used to support the subject-specific educational methodology to facilitate the course online (Georgouli, Skalkidis & Guerreiro, 2008).

A study done by Garrote and Pettersson (2007) revealed that the academic lecturers have certain needs to implement or use in the LMS. Therefore, the system must be reliable and easy to use. The lecturers need proper training and readily available support from development staff to give advice on the use of the LMS. They need applicable examples as benchmarks and they must be enabled to use the features of the LMS that will reduce lecturers' workloads. The most important concern for the researchers was the time and effort that will be needed to implement the LMS in comparison with the expected gains (Garrote Jurado & Pettersson, 2007). The study revealed that the lecturers expected the institution to provide them with necessary support, resources and work processes.

Although the general perception of the lecturers was positive about the affordances of the LMS, it appears as if significant effort is needed before users experience the advantages of the system. Lecturers apparently did not experience a decrease in workloads and tended to use just the basic features of the LMS. The study also showed a significant difference in the attitude towards the LMS between lecturers that were novice users of technology and more experienced users of technology, especially in the need for education (training), support, encouragement and dedicated staff to assist lecturers in their everyday work environment (Garrote & Pettersson, 2007). It was found that lecturers could be eager to develop the e-learning courses, but the challenge of workload could inhibit their creativeness because of the time constraints (Weaver, Spratt & Nair, 2008; Cant & Bothma, 2010).

Accordingly, in section 2.4.1.1 the importance of the academic's technology adoption is discussed and in section 2.4.1.2 the academic's technology development is explored.

2.4.1.1 **Academic's Technology Adoption**

In a report from the Higher Education Funding Council for England (HEFCE, 2010) it was recognised that technology improvements are a major aspect of the context in which the education sector operates. Higher education institutions will need to provide more online learning, more online content by incorporating advancing technologies and technology-based services in order to adapt to the public experiences and expectations when it comes to accessing and sharing knowledge. The report also states that institutions have to consider how they can respond to the challenge to accommodate the need for updated staff development and ICT capacity.

LMSs have shown to be effective in supporting online learning by providing flexible tools in order to enhance teaching. However, technology alone is not sufficient, but the academic lecturers have to understand and know the potential it offers to use it effectively for enhanced online management of courses (Georgouli, Skalkidis & Guerreiro, 2008). Although technology innovation could add another dimension in educational development, there could be reluctance amongst academics to participate (Garrote & Pettersson, 2007; Heaton-Shrestha et al., 2005). Academics could feel uncomfortable with the change in education strategies. The effective utilisation of the LMS could not reach its full potential if the academic lecturing staff are not willing to conform to different instructional methodologies (Dooley & Murphy, 2001; McInnis, 2002).

2.4.1.2 **Academic's Technology Development**

In terms of the University's Operational Plan, all the Unisa academic lecturing staff needed to be trained in the use of approved technologies in teaching and learning, VLEs, blended learning and online learning (Unisa Operational Plan, 2013). It is noted that training and development interventions for academic facilitators should not only focus on the technical skill of e-learning, but need to include the philosophy of e-learning and the use and adaptation of teaching and learning strategies to obtain optimum skills to construct study material online (Vermeulen, 2011). In order to support the lecturers with the change to technology enhanced education strategies, the academic institution needs a professional development team to assist with the relevant development needs. This has been recommended for successful conformation to accept and the effective use of the LMS for online teaching (Panda & Mishra, 2007; Kyei-Blankson, Keengwe & Blankson, 2009; Kazley et al., 2013).

Sustaining this perspective to support staff training needs, Unisa has a Centre for Professional and Development (CPD) that is supposed to operate according to the *ODL policy* (Unisa, 2008) and the *Institutional Operational Plan* (Unisa Operational Plan, 2013). The purpose of the Centre is the professional development of Unisa's academic lecturing staff in accordance with the collaboratively identified teaching and learning requirements founded on Unisa's ODL model and pedagogy (Louw, 2011). Some of the CPD's intended functions are to -

- identify teaching and learning training needs;
- provide workshops for new and current academic employees in the Unisa teaching and learning environment;
- initiate, coordinate and promote best ODL teaching and learning practices in Unisa; and
- provide training in the use of applied technology solutions for teaching, learning and student support.

To complement the CPD, an *Academy for Applied Technologies in Teaching and Learning* was also established by Unisa. The purpose of the Academy is to research, develop, deploy and support innovative technology solutions for teaching, learning and student support, to provide opportunities for academics to experiment with new technologies and to provide technical and pedagogical support to academics during the development phase.

The CPD has identified four levels in the approach to the conversion from printed study material, to online delivery considering curriculum change with pedagogical implications. The four groups are:

- Group A – Only documents (*pdf* format) are uploaded on the LMS. The lecturer has little or no online presence.
- Group B – Documents are uploaded, but with some value added, e.g. more LMS tools are used.
- Group C - Conversion from print to online delivery, for example Learning Units (an LMS tool) are utilised; online learning activities and tasks (for example, more LMS tools, wikis, blogs and Q&A etc.) are used; and interactive learning tasks and group work are employed.
- Group D – Study material fully online with consideration of curriculum development for ODL: As in Group C with addition of online assessment tasks.

The CPD's interventions are only applicable from Group C level (See Figure 2.9).

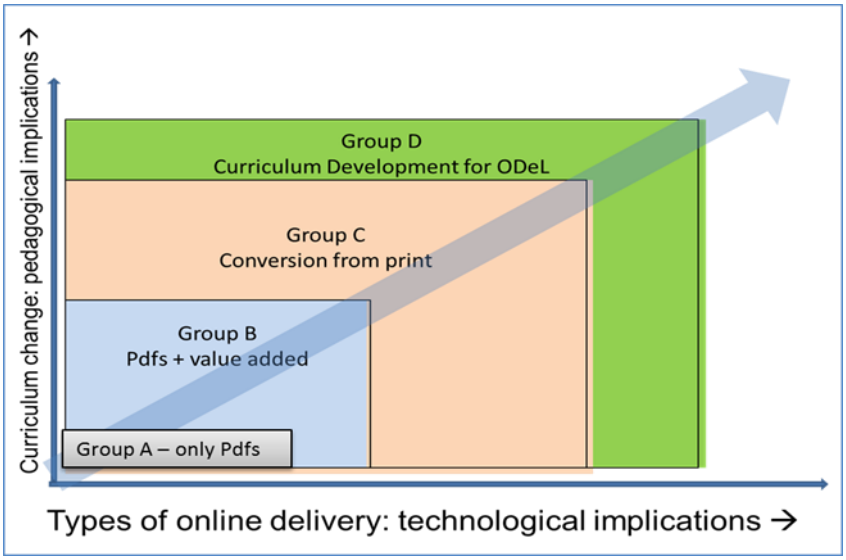


Figure 2.9: Centre for Professional Development VLE interventions

A similar model was proposed in a research project by Badawood et al. (2013) which also focused on improving academic's ability to support the pedagogy with technology. The model's intention is to support a systematic and effective program for online teaching. The researchers' model is structured into five levels according to the academic's capability in the recommended processes for course development. The model is structured from level one to five, with the respective focuses of the levels being - *Aware; Capable; Knowledgeable; Proficient* and *Practitioner*, where *Aware* represents only to be the least knowledgeable and *Practitioner* represents the facilitator who has the required skills to manage student assignments in terms of time, tasks, and collaboration, as well as to utilize the technology to offer a pedagogically effective learning experience (Badawood et al., 2013).

The blended learning approach was adopted by Unisa and in May 2014 the new model was presented at a Directorate for Teaching and Learning Seminar on Blended Learning: "Blended Learning and Mixed mode of learning in Open and Distance Learning". The presentation of the development to "fully online" as illustrated in Figure 2.10 shows the addition of different components (which could be activities or resources in this instance) as the development progresses from paper based courses to fully online courses. The "low-blend" concept is to have study guides and basic resources (usually .pdf format) available on the LMS. The "fully online" concept inclines to have the course to be online with additional resources (e.g. open educational resources, podcasts and multimedia) and activities like group discussions and blogs.

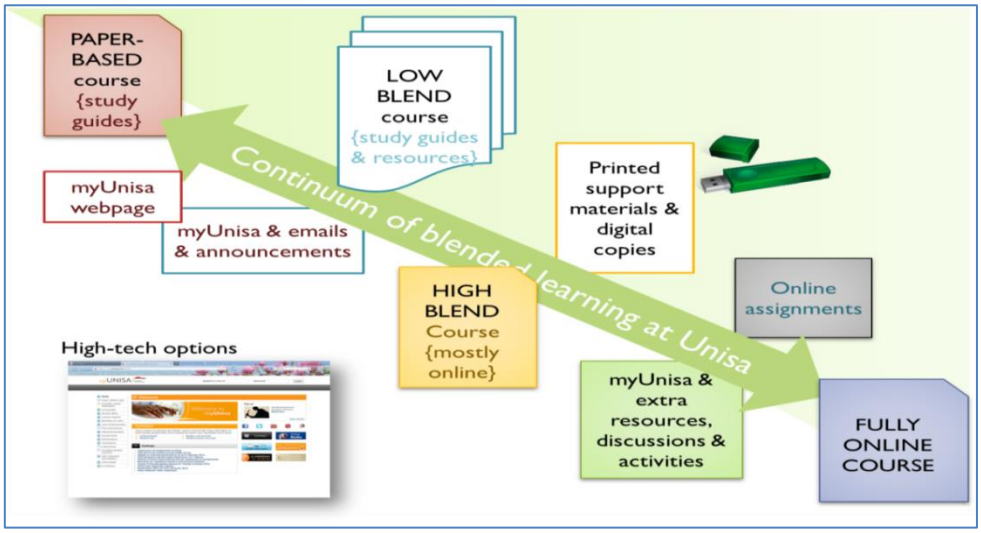


Figure 2.10: Proposed development from print to blended to fully online (according to Unisa CPD 2014)

2.4.2 System: The LMS

The aspects that are important and will influence the academic lecturers' UX when using a system, are inter alia the functionality, aesthetics, responsiveness, usefulness and ease of use (Roto et al., 2010). The qualities and reliability of these features would encourage or discourage the lecturer to utilise the system.

The system, as a component of UX which is in the current study the LMS, is discussed in the following sub-sections. Section 2.4.2.1 discusses the LMS in Unisa and particular matters regarding the LMS and section 2.4.2.2 examines the pedagogical appropriateness of the LMS.

2.4.2.1 **Learning Management system**

The LMS in use at Unisa is the Open Source LMS Sakai. It was deployed in Unisa in 2006 and became known as *myUnisa*. SAKAI is an open-source collaboration and courseware management platform

that allows institutions to modify the software to meet their own needs. The *myUnisa* platform is recognised in Unisa as the core of the academic network and is supposed to be the academic, administrative, support and social space to give students a single point of entry in their communication with Unisa. The purpose of an LMS is to allow academic lecturing staff to rapidly create online course content, develop learning activities, post resources, initiate discussions, provide the mechanism for submission of work and facilitate communication between academics and students. *myUnisa* is intended to be the communication link between the lecturer, the student and the university in an ODL environment (Ice, 2013).

There are several problems associated with the quality and features of the general LMS e.g. poor usability for lecturers, as well as students, poor customisability of the system that makes it intricate to adapt and accommodate specific needs, poor reusability and time consuming (Avgeriou et al., 2003). Vrasidas (2004) recommends the following learning principles for effective online learning combined with academic needs for LMS support:

- An LMS should support various kinds of interactions between students and lecturer.
- An LMS should provide tools that enable academics to integrate practical activities effortlessly in order to link the content to real world contexts.
- The LMS could integrate automated feedback with the use of Intelligent Agents to help the lecturer to monitor student progress.

Additional to this, an evaluation done by Beatty and Ulasewicz (2006) reported that the ease of use of the LMS's user interface for facilitation of online learning, contributes to the UX of the lecturer, which tends to impact the student experience as well. This evaluation also disclosed that different subject matter experts have different preference in tools and ways of presenting courseware. Vrasidas (2004) states that the lecturer needs extra support in order to focus on quality teaching and learning so that the online teaching offered to the students will have a positive educational impact. The use of the technology should synchronise with the instructional design and subject matter to support knowledge construction in a distance learning environment.

2.4.2.2 **The pedagogical appropriateness of the system**

There are four inclusive e-learning objectives that define the principles of the education system and its challenge to the technology, namely personalised learning, inclusion, flexible learning opportunities and productive time (Laurillard, 2007).

The principles of effective teaching as described by Chickering and Gamson (1987) are also applicable to online learning, in that online learning:

- encourages contacts between students and faculty;
- develops reciprocity and cooperation among students;
- uses active learning techniques;
- gives prompt feedback;
- emphasises time on tasks; and
- respects diverse talents and ways of learning.

However, in order to conform to these effective teaching practices, the LMSs should accommodate the pedagogically effective practices by integration of features in the LMS as proposed in the study by Wang et al. (2013). They found that the extent of configurability of the LMS could influence effective teaching practices amongst lecturers and postulated that the configurability should be on the following three levels:

- Interface configurability - how the software permits change of look and feel.
- Interaction configurability - how the software permits enabling of different communication mechanisms.
- Content configurability - how the software permits flexible options to modify or arrange content and easily distribution of content (Wang et al., 2013).

It is emphasised that there is a close relationship between the development paradigm and the construction of the product. Therefore utilised learning theory should be in sync with the underlying theoretical ethos, the development environment and the instructional strategies (Winn, 1999).

As this research's focus is on the academic lecturing staff members that have to prepare the educational content through an e-learning platform, an acknowledgement of the different schools of thought is relevant for this overview. Dabbagh (2005) outlines three schools of thought regarding learning theories. These theories of learning inform the goals and models associated with instruction, which in turn, influence the perspective of the use of technology in teaching and learning (Dabbagh, 2005; Dede, 2008) and entail the following:

Table 2.5: Three schools of thought on learning that influence teaching (Dabbagh, 2005; Dede, 2008)

Objectivism/behaviourism	Cognitivism/pragmatism	Constructivism/interpretivism
• Reality is viewed as objective and external. • Knowledge is seen as gained through experience.	• Reality is mediated through cognitively developed representations. • Knowledge is negotiated through experience and thinking.	• Reality is internal. • Knowledge is constructed.
Goals of instruction		
• Communicate or transfer behaviours representing knowledge and skills to the learner (does not consider mental processing). • Instruction is to elicit the desired response from the learner who is presented with a target stimulus. • Learner must know how to execute the proper response, as well as the conditions under which the response is made. • Learner acquires skills of discrimination (recalling facts), generalization (defining and illustrating concepts), association (applying explanations), and chaining (automatically performing a specified procedure).	• Communicate or transfer knowledge in the most efficient, effective manner (mind-independent, can be mapped onto learners). • Focus of instruction is to create learning or change by encouraging the learner to use appropriate learning strategies. • Learning results when information is stored in memory in an organized, meaningful way. • Lecturers are responsible for assisting learners in organizing information in an optimal way so that it can be readily assimilated.	• Build personal interpretations of the world based on individual experiences and interactions (constantly open to change, cannot achieve a predetermined correct meaning, knowledge emerges in relevant contexts). • Learning is an active process of constructing rather than acquiring knowledge. • Instruction is a process of supporting knowledge construction rather than communicating knowledge. • Do not structure learning for the task, but engage learner in the actual use of the tools in real world situations. • Learning activities should be authentic and should centre on the problematic or puzzlement as perceived by the learner. • The focus is on the process not the product. • Role of lecturer is a mentor not a teller.

Objectivism/behaviourism	Cognitivism/pragmatism	Constructivism/interpretivism
		• Encourage reflective thinking, higher-order learning skills. • Encourage testing viability of ideas and seeking alternative views.

Table 2.5 reflects three main schools of thought on learning theories. These are not unified theories, but rather a collection of theories that are distinct from one another, but are linked together by a common set of fundamental assumptions (Dede, 2008). Other frameworks on learning that influence teaching do exist (Mayes, T. and de Freitas, 2004; AlQudah, 2014), but are beyond the scope of this study. The LMS needs to adapt to accommodate each of the three schools of thought on learning as those would influence how the lecturer thinks about teaching and eventually how they facilitate their course work.

2.4.3 Context: The University of South Africa, an ODL Institution

The context of use influences the UX which implies change in context could change the UX regardless of the system changes (Roto et al., 2010). This study acknowledges the following classes of contexts of use (Jumisko-Pyykkö & Vainio, 2010; Roto et al., 2010): physical context; temporal context; task context; social context and the technical and information context (see section 2.3.3).

2.4.3.1 **Physical context**

In this regard the physical context refers to the spatial location, functional place and space, and the physical environmental attributes. The context include the functional place, sensed attributes (audio, visual) or movement (physical position of user) (Jumisko-Pyykkö & Utriainen, 2010).

The physical space of the academic lecturers at Unisa is usually an office with a desktop computer or a laptop. Some of the lecturers occasionally work from home. Although the physical environment could have an influence on the UX, it was not explored or examined since it is outside the scope this research.

2.4.3.2 **Temporal context**

The temporal context concerned, refers to the duration of interaction and time attributes. It is essential to consider the temporal aspects of UX, in other words how UX evolves over time

(Karapanos et al., 2009; Law et al., 2009; Vermeeren et al., 2010). UX is dynamic, since every person's emotional state, skills and circumstances change over time. Therefore, the ideal would be to consider UX before, during and after use of a system or product. Roto et al. (2011) illustrate the four proposed stages or time spans of UX, namely the anticipated, momentary, episodic or cumulative UX stages (See Figure 2.11).

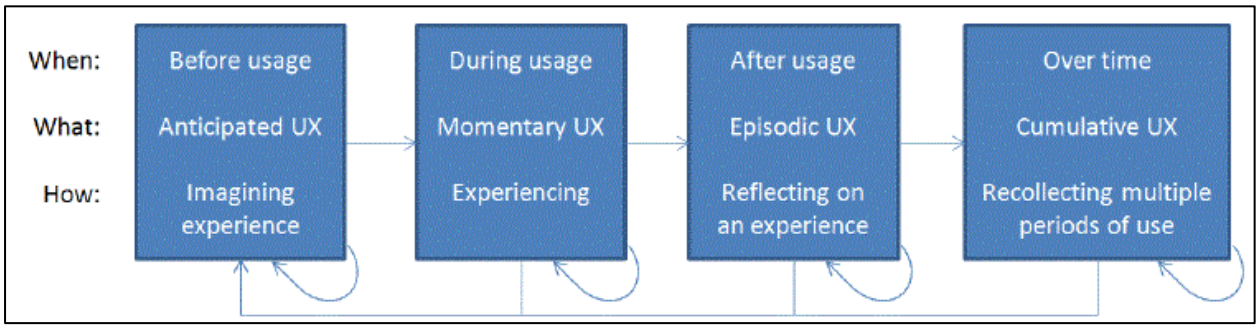


Figure 2.11: Time spans of UX (Roto et al., 2011)

It is necessary to specify the relevant time span for a particular research. In the current research the cumulative UX, which is the recollecting experiences with the general use of *myUnisa* for facilitation of online learning, were considered. Since there are so many different ways to do different tasks to create or facilitate an online course, the researcher decided to investigate the cumulative UX in order to obtain the overall perceptions from academic lecturers.

2.4.3.3 **Task context**

The task context concerned, refers to multitasking, namely other responsibilities that requires urgent attention and interruptions (Roto et al., 2010). An academic lecturer in Unisa inter alia has to prepare study material, examination papers, manage marking of assignments, manage tutors, take part in community engagement, achieve certain research outputs, attend meetings and perform certain duties for academic citizenship.

The general task list of an academic lecturer in Unisa involves the following tasks (extracted from recent advertisements for academic lecturers' vacancies on Unisa's recruitment website):

- Develops curricula that will support the Programme Qualification Mix (PQM) of the College.
- Quality assures tutorial material by adhering to quality standards regarding the design, content and publishing requirements for Unisa's tutorial material.
- Teaches undergraduate and postgraduate courses.
- Evaluates tutorial material of colleagues within Unisa and oversees that it is improved.
- Acts as course leader or course coordinator.

- Supervises/promotes Master and Doctoral students.
- Examines Master's and Doctoral students' dissertations and theses.
- Conducts research in order to produce at least four accredited research outputs in a period of three years.
- Mentors young upcoming researchers.
- Peer reviews articles and books.
- Participates in curriculum related community engagement and/or research-related community engagement.
- Participates voluntarily in University structures/committees on various levels.
- Is involved with professional, national and international bodies/boards that are related to his/her discipline expertise.

Academic lecturers indicated in an earlier study (Cant & Bothma, 2011) that they had time constraints and did not have sufficient time to spend on *myUnisa*. Their concerns were that teaching, research and administrative tasks, which were their key performance areas, were increasing and involvement with online learning by means of *myUnisa* was just adding to their workload without being a key performance area.

2.4.3.4 **Social or Organisational Environment**

The social context indicates the effects of other persons present and the related interpersonal interactions. The organisational environment has an effect on the usability and UX of a product. The attitudes of the organisation and its employees towards the system, the structure of the organisation, the way people work, the availability of support and frequency of interruptions, are also likely to affect the usability of a product (Maguire, 2001a).

Unisa is currently Africa's largest comprehensive dedicated open distance education university. The University offers a range of study choices, ranging from undergraduate degrees and diplomas, to Master's and PhD degrees. The University has eight colleges, the Colleges of Graduate Studies; Agriculture and Environmental Sciences; Economic and Management Sciences (where the Graduate School of Business Leadership (SBL) is incorporated); Accounting Sciences; Education; Human Sciences; Law; and Science, Engineering and Technology. There are approximately 350 000 registered students per year and approximately 1 500 permanent academic lecturing staff who offers courses.

VLE workshops are offered by the Centre for Professional Development (CPD) at Unisa, for training in the use of the *myUnisa* LMS. The intention here is to teach and support the academic lecturers in the use and facilitation of the online activities, tasks, interaction and communication tools. The CPD provides on-going support and training, but reported that they experience staffing issues and find attending to all training requests a challenge (Louw, 2011).

Since the teaching environment is an ODL institution which uses e-learning as a way of teaching it has an influence on the organisational practises and protocols. As stated by Maguire (2001a) it could influence attitude of employees, work circumstances, availability of support, interruptions and usability of the system. Consequently it will be discussed in the following sub-sections a) Open Distance Learning and b) E-learning.

a) Open Distance Learning

Open learning is described as "an approach to learning that gives students flexibility and choice over what, when, where, at what pace and how they learn. Open learning is all encompassing and includes distance education, resource-based learning, correspondence learning, flexi-study and self-paced study" (Unisa Council, 2008:2). *Distance education* is defined by the Commonwealth of Learning Organisation (COL) as the delivery of learning with a variety of facilitating methods used to transfer content, to provide tuition unobstructed by time and space and to measure outcomes (CoL, 1999).

ODL "is a multi-dimensional concept aimed at bridging the time, geographical, economic, social, educational and communication distance between student and institution, student and academic staff, student and courseware and student and peers. ODL focuses on removing barriers to access learning, flexibility of learning provision, student-centeredness, supporting students and constructing learning programmes with the expectation that students can succeed" (Unisa Council 2008:2). According to the Commonwealth of Learning Organisation the meaning of ODL embraces several implications, as it allows access to learning with minimum barriers with respect to age, gender, or time constraints and with opportunities of recognition of prior learning (CoL, 1999).

According to Unisa's ODL Policy (Unisa, 2008) there are certain principles to adhere to in the ODL model. Those principles that are applicable to the use of online delivery of courseware inter alia include advanced teaching and learning models; well-designed courseware; effective/efficient administration and timeous student support; and online distribution of content and information via *myUnisa*. Diverse technologies that will contribute to Unisa's educational disposition are to be included in the delivery of courseware. It emphasises that the appropriate use of technology is vital

to the survival of the institution as a global role player. The technology platform provides opportunities for staff and students to interact with each other and the institution anytime and from anywhere in the world. The policy states that the University will depend on well-defined processes, procedures and robust organisational systems supported by ICT and the University will evaluate and develop its technology infrastructure and ODL capacities of academics on an on-going basis in order to give effect to its ODL mission.

Most of the academic lecturers are expected to work in an allocated office on the campus at Unisa. The offices are mainly situated on the two main campuses that are located in two cities in the province of Gauteng, South Africa. The University's main campus is in Muckleneuk, Pretoria, where six of the eight colleges are situated. The other main campus is situated in Florida, Roodepoort, where the College for Science, Engineering and Technology, as well as the College for Agriculture and Environmental Studies are located. Most of the lecturers work in their own offices on desktop personal computers or on laptops where all staff members have internet access with cable and/or Wi-Fi.

b) E-learning

Complementary to ODL is e-learning, which is the application of ICTs to enhance distance education, implement open learning policies, strategies, more flexibility and enable extensively distributed learning activities (Davis & Wong, 2007; Roby et al., 2013). The 'e' in e-learning refers to electronic, which adds a technological edge to learning as a term.

E-learning is defined as learning that is supported by ICTs by instruction which includes content relevant to the learning objective, uses instructional methods and builds knowledge and skills (Clark & Mayer, 2008). The objective of e-learning is to support learning in an educationally effective manner. Therefore, the contents and teaching strategies must be modified in order to fully exploit the obtainable technologies. Ardito et al. (2005) differentiate between the platform and the didactic component of an e-learning application. They propose that the *e-learning platform* is "the environment with a number of integrated tools and services for teaching, learning, communicating and managing learning material" (Ardito et al., 2005:276). The *didactic component* of e-learning is the educational content provided or delivered via the platform. The platform is thus the vehicle of delivery of educational content.

De Villiers (2005) proposed the Hexa-C Metamodel (HCMm) which integrates concepts from learning theory into a framework which can be used for evaluating e-learning resources and educational technology from the viewpoint of learning theory. Three of the concepts, namely constructivism,

cognitive learning theory and components, are primarily theoretical, while the others, that is collaborative learning, creativity and customization, are applied methods to be used by educators to support effective learning. This designates technology's role as the instrument that transfers the message, but not the message itself. According to this proposed Hexa-C Metamodel, these components are rooted in context. Therefore, the nature of each e-learning environment should be determined by its content and situation.

2.4.3.5 **Technical context**

The technical and information context refers to additional systems and services and their interrelations. The LMS is hosted by Unisa's ICT services and infrastructures and it depends on its uninterrupted and reliable operation. It is necessary that the technical infrastructure at the University is stable and that internet and *myUnisa* are constantly available – for the academics, as well as the students. The internet service provider also needs to be reliable in order to support Unisa's constant internet services.

Technology plays an integral role in ODL, and has accordingly been specified and explained in the Unisa's 2015 Strategic Plan, as well as the University's ODL Policy (Unisa, 2004, 2008). Therefore, it is vital that academics and all other staff become completely comfortable in a technology-based environment.

Knowledge and availability of additional educational resources to supplement the LMS is necessary to enhance courses, for example podcasts, interactive multimedia and PowerPoint presentations. Open Educational Resources (OER) allow free use of educational resources which can include course materials, streaming videos, software, tools, materials, or techniques used to support access to knowledge (Allen & Seaman, 2012).

In their investigation Bertino, Corrales and Chen (2012) determined that the quality of customer service of the Information Technology (IT) help desk contributed to a better UX with the technology**.** (IT help-desks usually provide support for hardware and software problems).

2.5 Evaluating the User Experience

Literature indicates that evaluating UX concerns the evaluation of the whole UX and could be the evaluation from the expectation *before* using the system, to interaction *while* using the system to reflection *after* using the system (Tractinsky, Katz & Ikar, 2000; Bevan, 2009; Law et al., 2009; Roto

et al., 2010; Bargas-Avila & Hornbæk, 2012). According to Bevan (2009) UX can be conceptualised as an elaboration of the satisfaction component of usability, as well as the user's perceptions and responses. Research objectives in this instance are primarily to optimise human performance and to optimise user satisfaction (with attaining both pragmatic and hedonic goals). The process of evaluating the UX is intended to identify and acknowledge possible problems and to subsequently give direction to optimise the product or system for the user group (Hellmers et al., 2012). Bargas-Avila and Hornbæk (2012) propose that in former research the user satisfaction and experience was mostly evaluated *after* the experience with technology. They discovered that only a few studies examined the expectations of the user *before* the experience with the technology. It is also essential to look beyond static aspects and to investigate the temporal aspects of UX – how the quality of UX changes over time and thus alters the UX over time (Hassenzahl et al., 2000; Karapanos et al., 2009; Law et al., 2012).

Before a user interacts with a system for the first time, there usually is an expectation on how the experience would be, but it is not yet a UX. There are circumstantial factors that will influence that expectation, for example the reasons why the user will use the system, or what the user's skills and knowledge are. The expectation will influence the actual experience because the user will evaluate the experience against the expectation (Roto, 2007). While the interaction between the user and system takes place, there is a momentary UX which affects the overall UX of the system. This experience of the user will change over time, because of new insight and knowledge gained with every interaction. Therefore, as depicted in Figure 2.12, evaluating the long term UX will provide a better indication of the overall UX.

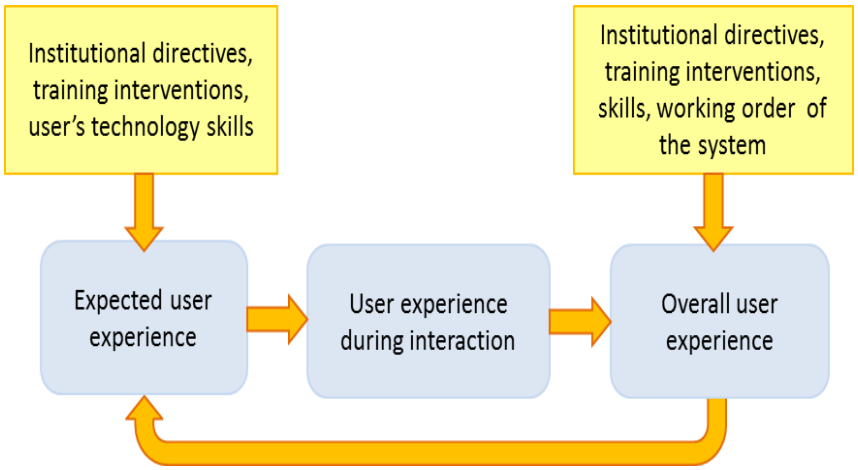


Figure 2.12: Phases of UX – adapted for this study from (Roto, 2006)

During the interaction the components of UX - the user, system and the context, will have an effect on the UX. The process of evaluating the UX is intended to identify potential causes of difficulties

and misunderstandings, and in order to improve the system for adaptation for the intended user group (Hellmers et al., 2012). Data collection for UX is more about the perceived quality, enjoyment and fulfilment and less about the speed of task completion or number of errors (Scapin et al., 2012).

In the early days empirical studies in the field of UX were an exception and it, therefore, encouraged Hassenzahl et al. (2003) to create a measurement instrument combining usability and UX constructs. Hassenzahl's intention was to take into consideration the cognitive and task concerns, as well as the dimensions of stimulation, identification and attractiveness of UX. Another UX measurement instrument was developed by Laugwitz et al. (2008). The instrument was constructed with the intention to measure UX in a simple and quick way, but with all-inclusive aspects of the user's experience with software products. The resulted instrument consists of a 26 item questionnaire including the six factors attractiveness, self-expression, efficiency, dependability, stimulation and novelty.

The current research aimed to explore the UX of the academics by considering their reflections of the LMS *while* using the system and *after* using the system. It reflects on the user satisfaction component, as well as on the experiential and emotional aspects.

2.6 Summary

This chapter aimed to contextualise the research and answer sub research question 1: What are the components of the UX when using an LMS?

The view as presented by Hassenzahl & Tractinsky (2006) specified that UX is the consequence of interaction between three components, namely the *user*, the *system* and the *context* within which the interaction occurs and is adopted for this study. The user, the system and the context, as the identified components of UX then also form the units of analysis for the case study towards the conceptual framework as a representation of the UX of academic lecturing staff in the use of an LMS tool in an ODL institution.

The factors that could influence the UX when using an LMS were identified in the literature and are grouped together because they correspond to a specific unit of analysis within the case of Unisa as an ODL institution. It is depicted in Table 2.6.

Table 2.6: Components and factors summarised as derived from literature

UX components from literature	**Factors that could influence the UX when using an LMS**
User	The academic has certain *needs* when facilitating courses in an online environment
	The *skills* of the academic could influence the UX when using the LMS
	The academic's *mood, perspective, characteristics*, etc. could influence the UX
System	*Pragmatic* quality: The (technical) usability of the system (LMS)
	The pedagogical *appropriateness* of the system (LMS)
	Hedonic quality: Pleasure and attractiveness
Context of use	Organisational: The ODL *context strategies*; development/training support
	Institutional *administrative and structural procedures*
	Technical: *Available technologies* to be used with *myUnisa* such as multimedia and collaborative toolsets in a distributed web-based environment, OER. Technical support to use these technologies.

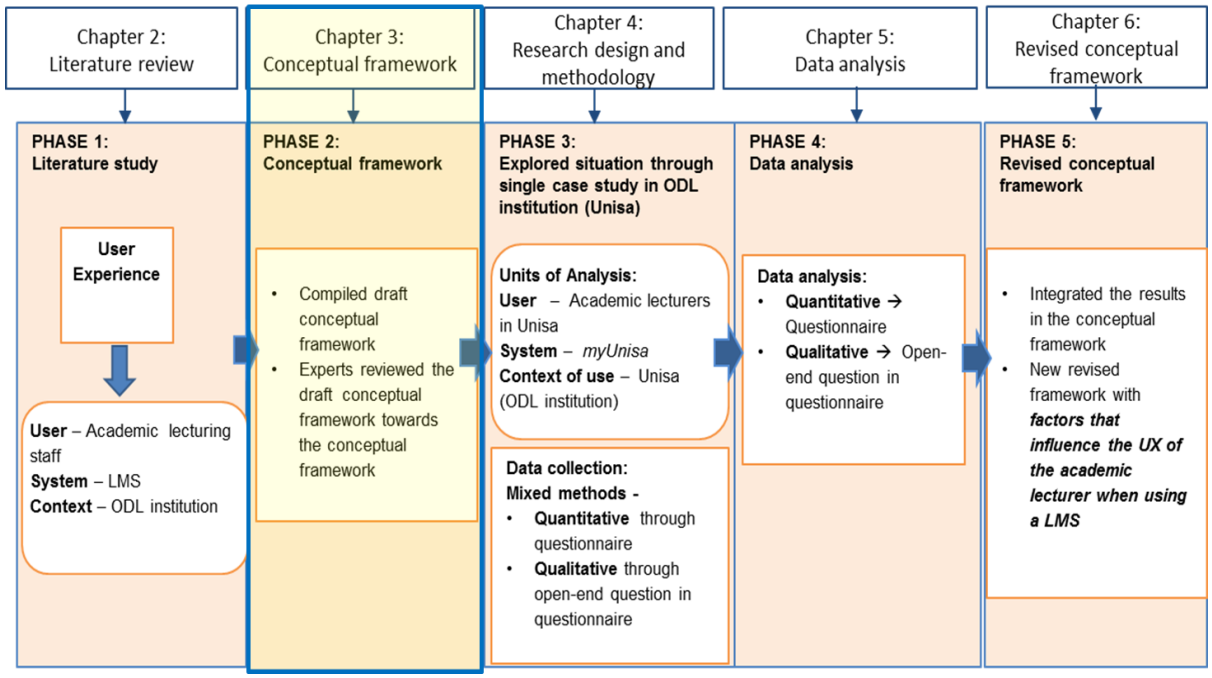
Studies on UX mostly focused on positive experiences (Hassenzahl & Tractinsky, 2006). Positive affect has been found to have many kinds of positive consequences on cognition, for example, enabling more effective decision making (Isen, 2008), while understanding negative experiences and the conditions in which they arise may prove very important in order to further develop products iteratively based on the UX evaluations. Positive experiences with the technology strongly depend on the usability of the system, but when someone has a negative experience with a specific tool in that system, that negative experience is often associated with the system as such. These misunderstandings then prevent people from utilizing the functionalities in future situations (Cantoni, Cellario & Porta, 2004). If a system is considered as complex to use, increasing experience with that system could get a user more intrigued or attracted to it because it induces an interesting challenge (Khalid, 2006). The current study investigated the positive, as well as the negative experiences and the consequences on the academic staff's perceived ability to facilitate teaching with the use of the LMS.

As noted, UX may change over time. The current research aimed to explore the overall perceptions of the UX of the academics by considering their reflections of the LMS while using the system and after using the system.

In the following chapter a conceptual framework is presented to document the factors identified in the literature study.

CHAPTER 3: CONCEPTUAL FRAMEWORK

CHAPTER CONTENT:



3.1 Introduction

This chapter aims to compose a conceptual framework that presents the foundation towards answering of the sub research question 2: **What are the factors that will influence the UX when using the LMS in an ODL institution?** The draft conceptual framework (Appendix A) is presented indicating the components (identified in Chapter 2) and associated factors that could have an impact on the UX of academic lecturing staff in their endeavours to facilitate courses online with the use of an LMS in an ODL institution.

For this study the notion of UX, as expounded in Chapter 2 by Hassenzahl and Tractinsky (2006) is used. As such UX is seen as the consequence of the interaction between three components, namely the user, the system and the context within which the interaction occurs. The conceptual framework presented focuses as follows on these components of the UX:

- *the user* with its predispositions, expectations, needs, motivation, mood etc.;
- *the system* with the complexity, purpose, usability, functionality etc.; and
- *the context* as the ODL institution, with its requirements and demands.

Yin (2003) suggests that development of theory is essential prior to the collection of data when doing a case study. According to Gregor (2006) theory is "providing explanations and predictions and as being testable" (2006:614). In this chapter, a conceptual framework of components and associated factors that could influence the academic lecturer's UX when using the LMS, is presented. John Dewey (1938) in his classic work *Logic The theory of Inquiry* and Shields and Tajalli (2006) referred to a framework of conceptions as a map to a destination. A conceptual framework could aid in the connection between theories (from literature) to the problem resolution. Dewey (1938) recommended this approach to guide the inquiry of theory to the data collection process (e.g. questionnaire design) to the interpretation (content analysis) of the data. In other words, it is a navigational tool to direct the informative literature in the research to the "experience or the experiential world" (Shields & Tajalli, 2006:316). The use of a conceptual framework enables the researcher to reflect on the previous literature, categorise it and connect it to the research problem, which informs and gives direction to the data collection and analysis. The identified categories help with the organisation of the inquiry in order to link the concepts with the research questions.

The *draft* conceptual framework (Phase 2) is derived from the literature review documented in Phase 1, Chapter 2. Factors that could influence the UX were identified and grouped under the relevant components. These factors are assembled as evidences from literature and stated as propositions of factors that could influence the academic lecturer's UX when using the LMS in the

ODL environment. The resulting *draft* conceptual framework is validated through expert reviews and suggestions incorporated to compose a conceptual framework (Phase 2). The process is schematically presented in Figure 3.1.

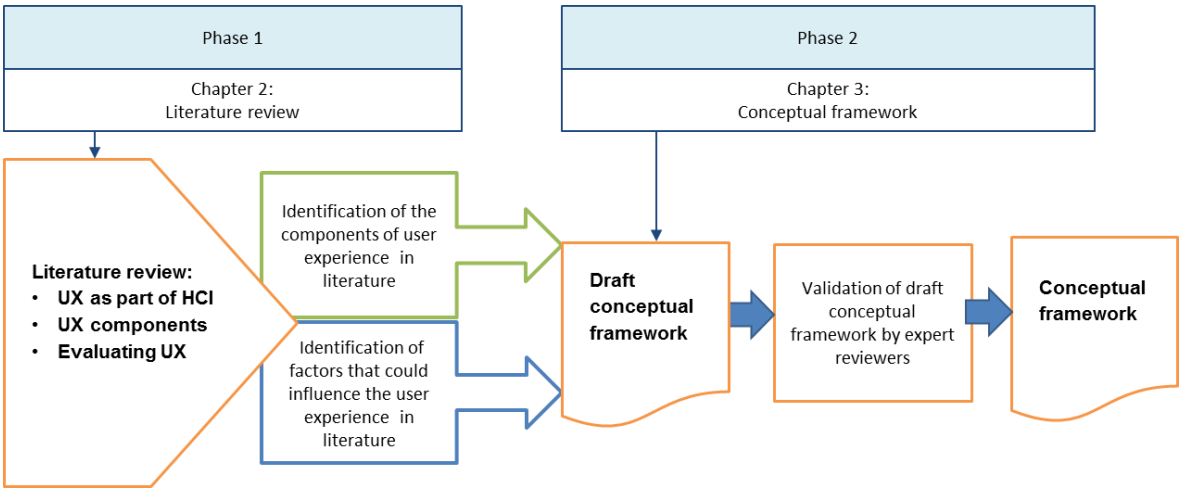


Figure 3.1: The process of composing the conceptual framework

Having outlined the process of composing the conceptual framework, the following section consists of an overview of the expert review of the draft conceptual framework.

3.2 Expert Review of the Draft Conceptual Framework

The draft conceptual framework (Appendix A) was evaluated by five experts who were invited to review the framework and provide suggestions for improvement. The draft framework was sent out via email, including the '*Participant consent form*' and an explanation of the research project and what is meant by the term 'UX' (Appendix A). Four of the five experts were academic lecturers from the School of Computing in the College of Science, Engineering and Technology and one expert was a College Education consultant from the Directorate Curriculum and Learning Development. It was important to identify a group of reviewers that could provide formative input to the framework before the questionnaire was derived from it. The expert reviewers were chosen on the basis on their knowledge and personal experience in the disciplines of education, HCI and ODL. (Selection criteria are outlined in section 4.4.2.2 which consists of a detailed discussion of the expert reviewer's areas of specialisation and years of experience).

The working draft of the conceptual framework was supplemented with the evaluator's feedback column (compare section 4.5.1). The evaluators were requested to rate the stated factors according to their opinion on the following four factors comprising a rating scale: *Very important; Important;*

Neutral; or *Unimportant*. The feedback received, was collated and if three or more of the experts rated a factor to be 'Neutral' or 'Unimportant' it could be considered that the factor did not significantly influence the UX when the academic used the LMS. These factors that were rated as not important by the reviewers are portrayed in Table 3.1 as the 'grey areas'. However, it was decided to include these propositions (factors) in the questionnaire to acquire more feedback from the survey participants.

Table 3.1: Extract from the expert reviewer's feedback

Compo-nent of UX	**Principle factors that will influence the UX with the use of technology**	**Factors that could influence the UX when the academic uses the LMS (myUnisa)**	**Evaluator's feedback**			
			Please mark the column that express the importance of the factor in your opinion			
			Very important	**Impor-tant**	**Neutral**	**Unimpor-tant**
User – the academic	The academic has certain cognitive and emotional needs when using technology for online course delivery	The academic needs to feel challenged to take on and master difficult tasks to use the LMS				R T H L
	The skills of the academic	The academic requires professional development interventions		J R	L T H	
	Emotional status (mood) of the academic	The academic's perception of non-instrumental (aesthetics, pleasure, fun etc.) qualities of the system could influence the UX	J	R	L T H	

Four of the five reviewers were interviewed to discuss potential confusion or terminology, categorisation of the concepts and to gain more information regarding the ODL context in the institution. The fifth reviewer was admitted to hospital and the researcher decided not to interview this reviewer. The interviews were semi-structured since it was discussions of the factors and propositions stated in the draft conceptual framework. The responses that were obtained through the interviews with the experts were taken into consideration. The following remarks by the evaluators were noted regarding the use of the LMS:

- The system should be intuitive enough to use with minimal training. "Onscreen help" will be an advantage.
- Quantity of training and support will depend on the usability of the LMS.
- Good examples of the use of the LMS from case studies should be provided to academics.

- "It is not a game or entertainment - it is a task that must be completed. The UX in this specific case will be related to how well the academic is supported in his/her task completion."
- There are different phases or levels when using the LMS for facilitation of a course, namely -
    - content upload and management;
    - administration and monitoring of schedules, tasks, etc.; and
    - communication and discussions with students.
- An additional development space where the LMS could be tested and experiment with could be valuable.
- The SAKAI LMS is not very accommodating towards ODL.
- Time constraints regarding the extended expectations for blended learning, as well as the tight teaching schedules due to semester courses are challenging.
- The poor functionality of the onscreen marking tool for the marking of assignments (JRouter) has a negative impact on the attitude and time towards the use of *myUnisa*.
- More flexibility regarding the utilisation of the LMS with reference to content, system and time would be useful.
- Tools to create media are challenging (for example Camtasia ® and podcasts).
- When a course has a huge number of students (one of the reviewers courses had approximately 14 000 students per year), the LMS can reduce the time spent. Without the use of the LMS in this instance, it would not have been possible to manage a course with such a large number of students. The LMS could reduce the time and costs spent on distribution of content, it reduces the communication time between the students and the academic lecturer because most problems are administered or answered in a collective way through the use of discussion forums or by means of the Questions and Answer tool in the LMS.
- The additional tools that are available for use by the LMS can only be utilised if the tools are known to the academic lecturers.
- Academic lecturers who offer certain courses (e.g. science, mathematics and accounting) need supplementary fonts and advanced notation functionalities to compose script for delivery through the LMS.

Several of these issues mentioned were opinions of individuals and could not be validated by literature, but it nevertheless should be considered since it came from experts who have insight in the actual circumstances within the case study environments. It could be a limitation that this

review was done only by experts who were highly computer literate, i.e. persons who could perform specialised computer tasks and were able to learn new skills on their own. Four experts were knowledgeable regarding HCI and comfortable with the use of the LMS. This meant that the situation of novice users regarding this matter had to be noted for more detailed consideration at a later stage.

After responses from the reviewers were considered and processed, the factors that could influence the UX when using an LMS in an ODL academic institution were amended accordingly to present the conceptual framework for this study (Table 3.2).

3.3 The Conceptual Framework

The conceptual framework for this study is presented in table form (Table 3.2). The first column shows the components of the UX as derived from literature and acknowledged as the user, the system and the context (Hassenzahl & Tractinsky, 2006; Roto et al., 2010). The second column categorises the identified factors that could be found in literature regarding UX of the use of technology. The third column states the proposed factors (propositions) that are more specific to the academic's UX when using an LMS in an ODL institution. The last column states the evidence as it was found in literature, which is the scholarly support for the propositions made in the third column.

Table 3.2: Conceptual framework for factors that could influence the UX of the academic when using an LMS

Component of UX	Principle factors that could influence the UX with the use of technology	Factors that could influence the UX when the academic uses the LMS (Preliminary Propositions)	Scholarly support - Literature
User – the academic	The academic has certain **needs** when using the LMS when facilitating online courses	The academic needs to perceive the system as useful	(Koehler & Mishra 2009)
		The academic needs to perceive the system to be easy to use	(Al-Busaidi & Al-Shihi, 2010; Salajan et al., 2011)
		The academic needs to feel competent and confident when using the LMS	(Laurillard 2008)
		The academic needs to feel the ability to use the system independently when facilitating an online course	(Partala & Kallinen, 2012)
		The academic needs to feel connected to students and colleagues through the use of the LMS	(Lenz, Diefenbach & Hassenzahl 2013)
		The academic needs to find pleasure in mastering the intricacies of the LMS	(Hassenzahl et al., 2000)
		The academic needs to feel motivated to use the LMS	(Gautreau, 2011)
		The academic needs to feel enabled towards creativity and innovation when using the LMS	(Laurillard, 2008)
		The academic needs training to use the LMS	(Cant & Bothma 2011); (Siritongthaworn et al., 2006);
		The academic needs easy obtainable support	(Panda & Mishra, 2007); (Weaver, Spratt & Nair, 2008)
	The **skills** of the academic could influence the UX	The academic needs to know how to use all the tools that are offered by the LMS for the facilitation of online learning	(Panda & Mishra, 2007); (Weaver, Spratt & Nair, 2008)
		The academic requires the knowledge to choose the correct instructional methodologies	(Panda & Mishra, 2007)
		The academic requires professional development interventions to enhance online facilitation skills	(Panda & Mishra, 2007)

Component of UX	Principle factors that could influence the UX with the use of technology	Factors that could influence the UX when the academic uses the LMS (Preliminary Propositions)	Scholarly support - Literature
		The academic needs to align conventional teaching methods to methods suitable for online learning strategies	(Siritongthaworn et al., 2006) (Vermeulen, 2011); (Mishra & Koehler, 2006)
	The academic's **predispositions** could influence the UX	The academic's attitude (positive or negative) towards using the LMS could influence the UX	(Albirini 2006; Celik & Yesilyurt 2013; Alkhalaf et al. 2012; Garrote & Pettersson, 2007)
		The academic's needs to be informed on the affordances of the LMS, that is the academic needs to know what could be accomplished by using the LMS	(Ellis et al., 2009; Gamage, Tretiakov & Crump, 2011; Pucillo & Cascini, 2014)
		The academic's expectations of the LMS's functionality could influence the UX	(Laurillard, 2008);(Hellman & Rönkkö, 2008)
		The academic's fear of the use of technology could influence the UX	(Müller, Law & Strohmeier, 2010; Chetty, 2014)
		The academic's lack of practical experience to use the LMS could influence the UX	(Pajo & Wallace, 2001; Kyei-Blankson, Keengwe & Blankson, 2009; Badawood, Steenkamp & Al-Werfalli, 2013)
	Emotional status (mood) of the academic has an influence on the UX	The academic's emotional status could influence the UX	(Thüring & Mahlke, 2007; Vermeeren et al., 2008)
		The academic's perceiving of non-instrumental qualities of the system (such as aesthetics, pleasure and fun) could influence the UX which is hedonic experience	(Law et al., 2008; Hassenzahl, Diefenbach & Göritz, 2010; Diefenbach, Kolb & Hassenzahl, 2014; Law, Van Schaik & Roto, 2014)
System - Learning management system	**The pragmatic quality** :The technical usability of the system (LMS)	How the academic will experience the effectiveness, efficiency and satisfaction when using the LMS to achieve specified goals will influence the UX	(Jumisko-Pyykkö & Strohmeier, 2008; Bevan, 2009; Thornton, 2013)
		The learnability of the system will influence the UX	(Maguire, 2001b; Weaver, Spratt & Nair, 2008; Kujala et al., 2011)
		The flexibility of the system will influence the UX	(Friedman & Deek, 2003; De Lera et al., 2013)

Component of UX	Principle factors that could influence the UX with the use of technology	Factors that could influence the UX when the academic uses the LMS (Preliminary Propositions)	Scholarly support - Literature
		The robustness i.e. responsiveness and recoverability of the system will influence the UX	(McInnis, 2002; Jamlan, 2004; Fresen & Boyd, 2005; Naidu, 2006)
		The constant availability of the LMS including the power supply	(Fresen & Boyd, 2005; Botha, Herselman & van Greunen, 2010; Al-Shboul, 2013); (Mallinson & Krull, 2006)
		The information security of the LMS i.e. information must not be lost	(Laugwitz, Held & Schrepp, 2008; Hassenzahl, Diefenbach & Göritz, 2010; Sharples et al., 2013)
		The response time of the LMS must be swift	(Bevan, 1999; Al-Busaidi & Al-Shihi, 2012; Moczarny, de Villers & van Biljon, 2012)
	The **pedagogical appropriateness** of the system (LMS)	How well the LMS facilitates the managing of learning activities	(Kukulska-hulme & Shield, 2004; Vrasidas, 2004; Zaharias & Poylymenakou, 2009; Dias & Diniz, 2012)
		The technology must be perceived as appropriate to use for teaching and learning in an open distance institution	(Cant & Bothma, 2011; Rubin, Fernandes & Avgerinou, 2013)
	Hedonic quality of the system	The academic's perceiving of non-instrumental (such as aesthetics, pleasure and fun) qualities of the system could influence the UX which is the hedonic experience	(Law et al., 2008; Hassenzahl, Diefenbach & Göritz, 2010; Diefenbach, Kolb & Hassenzahl, 2014; Law, Van Schaik & Roto, 2014)
		The visually attractiveness of the LMS is important	(Hassenzahl & Tractinsky, 2006)
Context of use – ODL institution	**The ODL context** defines strategies to align relevant curricula with new policies and innovations	The time constraints due to compulsory presentation of multiple modes of delivery which is print based, as well as online distribution of teaching material	(Unisa, 2008; Unisa Operational Plan, 2013; Chetty, 2014)
		The ability and knowledge of the academic to follow ODL strategies	(AlQudah, 2014)

Component of UX	Principle factors that could influence the UX with the use of technology	Factors that could influence the UX when the academic uses the LMS (Preliminary Propositions)	Scholarly support - Literature
	Unisa is a large organisational setting with complicated **administrative and structural procedures**	Schedule for semesters are tight and academics have to act in accordance with the university's schedules	(Unisa Operational Plan, 2013)
		Academics have to interact with students, tutors and other lecturers by means of the LMS	(Laurillard, 2008)
		The time constraints due to administrative schedules and tasks	(Unisa Operational Plan, 2013)
	Available additional technologies to be used with the LMS e.g. rich media and multi-directional, multi-user, collaborative toolsets in a distributed web-based environment, OER	The academic's knowledge regarding available media and additional technologies influences the UX	(Cant & Bothma, 2011; Chetty, 2014)
		The academic's access to these media is readily available	(Aktaruzzaman, Huq Shamim & Clement, 2011; Dikshit, Garg & Panda, 2013; Chetty, 2014)
		The pedagogical appropriateness of the available media	(Friedman & Deek, 2003; Koehler & Mishra, 2009; Fresen, 2011)
	Quality of professional **development facilities** will influence the proficiency of the academic to use the LMS	The development and support to academics have to be adequate in order to use the online activities and interaction tools	(Louw, 2011); (Louw et al., 2013); (Unisa Operational Plan, 2013)(Charalambos, Michalinos & Chamberlain, 2004; Panda & Mishra, 2007; West, Waddoups & Graham, 2007)

The conceptual framework demonstrates the components of the UX as the user (the academic), the system (as the LMS) and the context of use as an ODL institution. The principle factors that could influence the UX when using technology are needs, skills, predispositions and emotions of the user. Regarding the system the factors were identified as the pragmatic qualities of the system; the pedagogical appropriateness of the system and the hedonic qualities of the system. The factors regarding the context of use that have been identified as influential towards the UX with the use of technology are the ODL strategies and policies, the considerable administrative and structural procedures which is part of the institution and available technologies with the developmental support to use these technologies. The principle factors were expounded by statements (propositions) in order to represent the situations of the user experiences in the ODL context.

3.4 Summary

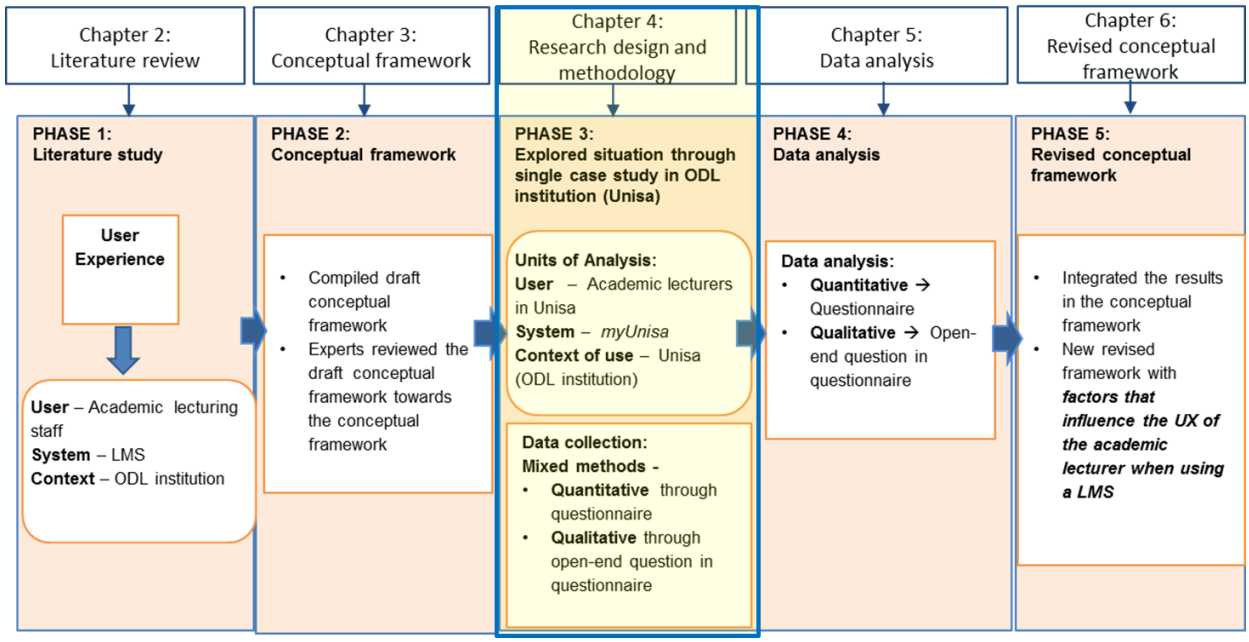
This study aims to represent factors that influence the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution. In order to achieve this aim, a literature study was conducted as a prelude to constructing a conceptual framework that would guide the exploration in the case study. Components for the UX were identified as the *user*, the *system* and the *context*. Factors were derived from literature and grouped under the relevant component towards answering of the sub research question 2.

From these insights a draft conceptual framework was constructed. This initial draft was validated by five experts and their feedback was incorporated in it. An updated version of the conceptual framework, presented in this chapter, guided the further exploration to determine how these revised factors were experienced by the academic lecturing staff as users in the context of an ODL academic institution (Shields & Tajalli, 2006). This contextualised the framework towards presenting the UX of academic lecturing staff in the use of an LMS tool in an ODL institution and thereby answering the main research question.

The following chapter outlines the research design used to achieve this objective.

CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY

CHAPTER CONTENT:



4.1 Introduction

The aim of this study is to represent factors that influence the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution. In order to realise this aim, components of UX were adopted (Hassenzahl & Tractinsky 2006) and factors identified that influence the UXs of academics when they use an LMS to facilitate learning in an online environment in an ODL institution. The literature engagement (Chapter 2) led to the construction and validation of a conceptual framework presented in Chapter 3.

This chapter outlines the research design and methodology used to conduct the study towards answering the research question which reads as follows:

How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution be represented?

The sub research questions dealt with, reads as follows:

Sub research question 1: ***What are the components of the UX when using an LMS?***

Sub research question 2: ***What are the factors that will influence the UX when using the LMS in an ODL institution?***

4.2 Research Process

The research was conducted through five phases and applied a single case study design (Yin, 2003) adapting the convergent parallel mixed method for data collection purposes (Creswell & Clark 2011). The research took place in the following five sequential phases.

Phase 1: Literature review

The literature review (Chapter 2) explored relevant literature concerning UX and contextualised the inquiry. The review was extended to include an investigation on current research concerning UX, the relationship between UX, usability, LMS, and ODL, and outlined the general factors that influence UX. The components for UX were adopted from Hassenzahl and Tractinsky (2006) as the *user*, the *system* and the *context*. The review reflected literature from UX research, research regarding academic lecturers' experiences with LMSs, and literature regarding the ODL context. Phase 1 answered the first sub research question and presented the components of UX as the user, the system and the context.

Phase 2: Conceptual framework

Phase 2 provided answers to sub research question 2 as a draft conceptual framework that was compiled through the inspection of relevant literature documented in Phase 1 (Chapter 2) and consisted of the following:

- A draft conceptual framework was compiled according to the identified UX components (adopted from Hassenzahl & Tractinsky 2006) and potential factors that could influence the UX. The factors were expanded on with aspects that are related to the specific case study, which is the academic lecturing staff using *myUnisa* as the LMS in Unisa as an ODL institution. An initial draft of the conceptual framework was reviewed by five expert reviewers in the fields of usability, ODL, CPD, instructional design and pedagogy. An academic lecturer that practises online teaching in several subjects, a usability expert and a UX expert were part of the reviewers. See sections 3.3 and 4.5.1.1 for a detailed discussion on the expert evaluation that validated the conceptual framework. These experts were selected from diverse domains in order to obtain more comprehensive feedback from different viewpoints, to perform a deeper evaluation, that is different aspects were taken into account as advocated by Ardito et al. (2005). The researcher conducted semi-structured interviews with four of the five experts to discuss potential confusion or terminology. There was an open invitation to the participants to give their opinion on the applicability of the factors to the certain LMS in the ODL context.
- Feedback from the experts was incorporated in the initial version of the draft conceptual framework and is presented in section 3.3.

Phase 3: Data collection

In Phase 3, data collection was done by adopting the convergent parallel mixed method described by Creswell and Clark (2011). A questionnaire was derived from the conceptual framework and used to collect both qualitative and quantitative data. It was distributed within the context of an ODL institution and comprised the following:

- A questionnaire (Appendix B) was compiled with the conceptual framework as a source of enquiry. The questionnaire consisted of two sections. The first section was compiled to collect the demographic information of the participants. The second section included ten questions from the System Usability Scale, SUS© (Brooke 1996 2013) which were adapted to enquire about the perceived usability of the specific LMS. The SUS questionnaire was chosen to be used as the usability metric for UX in this research. The SUS was assessed in a study by Finstad (2010) which

showed that the Usability Metric for User Experience (UMUX) and the SUS provided similar results.

- An additional 35 questions were added. These questions consisted of the propositions in the conceptual framework that were transformed into questions. The responses of section two were to be made on a 5 point Likert scale. The last question in the questionnaire was an open ended question.
- The questionnaire was piloted with three academic lecturers in the School of Computing, and reviewed by the statistician. After amendments have been made as advised, it was sent out to all the academics (1640) in Unisa. Note that not all the academics in Unisa are currently academic lecturers – some are in research or management positions. Unfortunately the specific details regarding the number of academic lecturers could not be provided by the Human Resource office in Unisa at the time of the data collection. The estimate is that there are more or less 1400 academic lecturers.
- The questionnaire was sent out and administered over a period of two months.

Phase 4: Data analysis

In Phase 4 the data were analysed independently in accordance with Creswell and Clark's (2011) outline for a convergent parallel mixed method. The use of a mixed method research, also sometimes referred to as multi method research, involves the application of two or more data sources or research methods, in the investigation of a research question (Creswell & Plano Clark, 2007; Goode et al., 2014). In this study, *mixed method research* refers to the combined use of quantitative and qualitative data collection methods in the same research. The motivation of mixed method methodology is strengthened by the principle of triangulation, which implies that more than one measurement procedure is used when investigating a research problem in order to enhance confidence in findings. The quantitative analysis findings are presented in section 5.3 and the qualitative analysis findings are presented in section 5.4.

Phase 5: Revised conceptual framework

The conceptual framework that resulted from Phase 2 was revised and amended to present an updated contextualised framework to represent the UX of academic lecturing staff in the use of an LMS tool in an ODL institution, to answer the main research question: ***How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution be represented?***

The research process in terms of the five phases applied in this study is schematically represented in Figure 4.1.

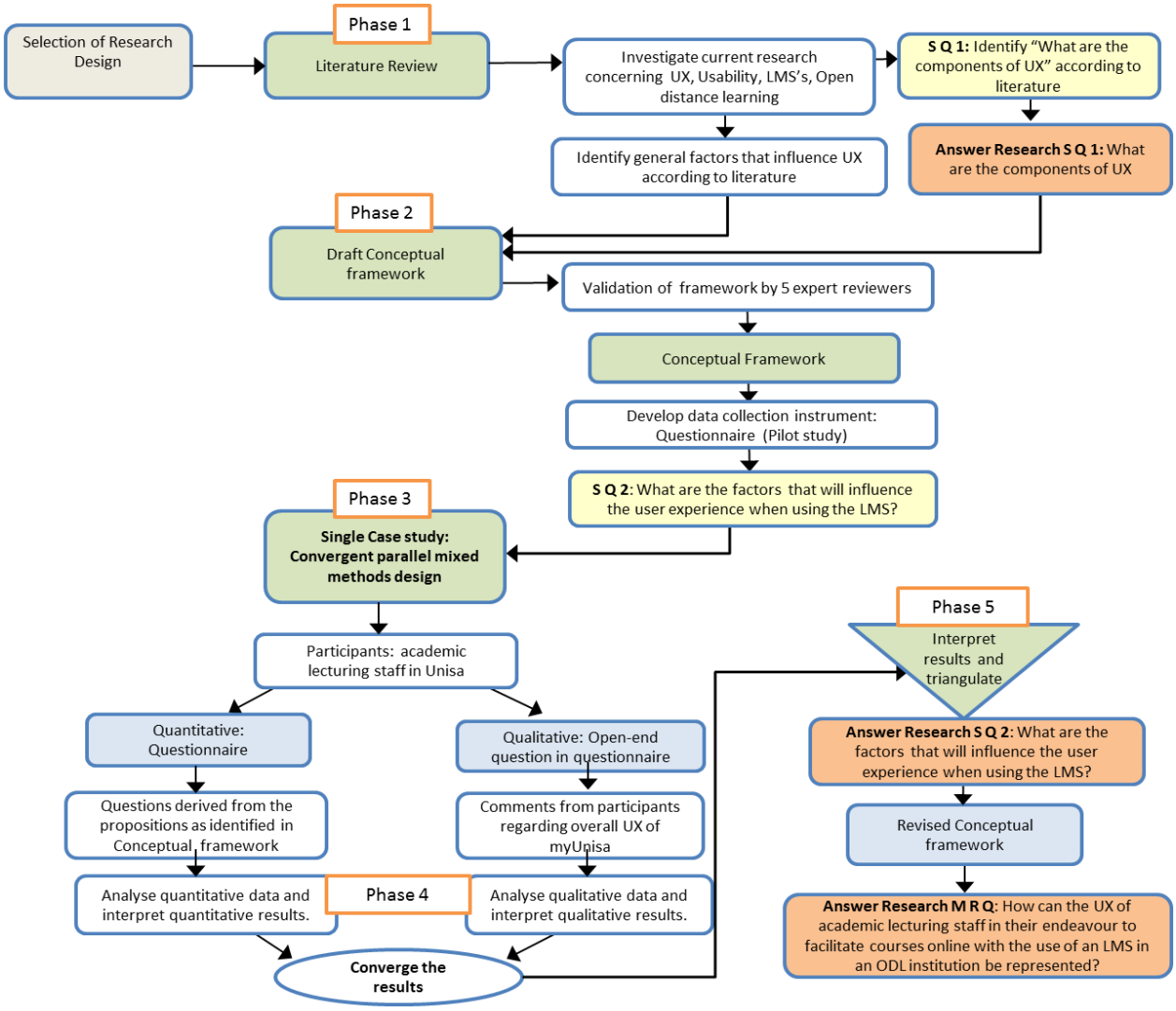


Figure 4.1: Schematic representation of the research process

4.3 Research Philosophy

According to Creswell (2003) three elements have to be considered when doing research, namely theoretical assumptions about what constitute *knowledge claims*; *strategies of inquiry* and *methods,* that is procedures of data collection and analysis. Crotty (1998) in turn, advises to consider four elements when performing research, namely *epistemology* (theory of knowledge); *theoretical perspective* (philosophical stance); *methodology* (strategy or plan) and *methods* (techniques) to be used.

In this research study an *interpretivistic research philosophy* was adopted. Terre Blanche and Durrheim (2006) explain that an interpretive research paradigm involves taking people's (in this case

the *users*) subjective experiences as important of what is real for them. Thereby, making sense of people's (the *users*) experiences by interpreting with them and listening cautiously to what they know, tell and believe (the epistemology). In this instance, use is made of qualitative research techniques to collect and analyse information (the methodology). The basic set of beliefs that guided this study reflected in Table 4.1, was adapted from Creswell (2007:17-18) with the aim of articulating the choices made when adopting the interpretivistic research philosophy.

Table 4.1: Philosophical assumptions with implications for this study (Creswell, 2007)

Philosophical assumptions with implications for this study		
Assumption	**Characteristics of interpretivistic research philosophy**	**Implication for this study**
Ontological (The nature of reality)	Reality is subjective and multiple, as seen by the participants in the study.	This research made use of quotes and themes derived from the participants' feedback and provided evidence of different perspectives.
Epistemological (The relationship between the researcher and what is being researched)	The researcher attempts to lessen the distance between the participants, the researcher and that which is being researched.	The researcher collaborated with the participants (review experts). The researcher was involved with participants in the use of the LMS and was immersed in the field of study with the participants over an extended period of time.
Axiological (The role of values)	The researcher acknowledges that the research is value laden and that biases are present.	The researcher openly declared the values that shape the interpretation in conjunction with the interpretation of participants.
Rhetorical (The language of the research)	The researcher writes in a personal voice and uses qualitative terms and limited definitions.	The voice of the researcher was be evident as a participant, collaborator and critical-researcher and employing the language of qualitative research.
Methodological (The process, strategy or plan)	The researcher uses inductive logic, studies the topic in context and uses an emerging design.	The researcher endeavoured to describe in detail the context of the study, working with particulars before generalisations.

4.4 Research Strategy

A research strategy can be defined as a plan of how the researcher will go about answering the research questions (Saunders et al., 2009). Research strategies include experimenting, surveying, conducting a case study, developing grounded theory, ethnographic investigation and action research. In this research a single case study was applied as a strategy (Yin, 2003).

The decision about the research strategy that was followed in this study was informed by Cohen Manion and Morrison's (2005) outline of the characteristics of available research strategies. Table 4.2 was used to base the decision from techniques described by Van Der Merwe, Cronjé and Kotze (2004) on.

Table 4.2: Research approach characteristics and research questions (adapted from van der Merwe, Cronjé & Kotze, 2005)

Approach	Characteristics	Question 1: What are the components of the UX when using an LMS?	Question 2: What are the factors that will influence the UX when using the LMS in an ODL institution?
Experiments	Control of experimental groups		
	Treats situations like a laboratory (removed from reality)		
	Causes due to experimental intervention		
	Does not judge worth		
Survey	Describes and clarifies		
	Extensive population		
	Numerical data		
Case Study	In-depth, detailed data derived from wide data sources	×	×
	Participant and non-participant observations	×	×
	Non-interventionist	×	×
	Empathic	×	×
	Holistic treatment of phenomenon	×	×
	What can be learned from a particular case	×	×
Grounded Theory	Emergent understanding of phenomenon		
	Collection, analysis and emerging understanding of data is a simultaneous process		
	Hierarchical coding processes		
	Categories and their properties are generated from the data		
	Conceptual relationships are grounded in the data		
	Data collection takes place till saturation is achieved		
Ethnography	Context specific	×	×
	In flux		
	Responsive to emerging features		
	Judgements accommodated within process		
	Long engagement		
	Time consuming		
Action Research	Context-specific	×	×
	Participant as researcher		
	Reflection on own practice		
	Solution biased		
	Empowering participants		
	Collaborative		
	Indorsing praxis and equality		
	Stakeholder research		

From the table based on the understanding of Cohen et al. (2005) and its application by Van Der Merwe, Cronje and Kotze (2004), the researcher was motivated to use a case study as research strategy in this research. In this study, the phenomenon (the UX of academic lecturing staff facilitating course work) is entrenched in the context of Unisa as an ODL institution and the use of an LMS. Having made a case for the choice of the research strategy, this section is an exposition of the case study strategy as applied in this research.

A case study provides an opportunity to study an individual, organisation or program in detail for a distinct period of time (Leedy & Ormrod, 2005). A case study is described as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident" (Yin, 2003:12). This is characteristic of the academic lecturing staff using the LMS at Unisa. The case study strategy is regarded as being useful to explore a situation which is unclear over time (Leedy & Ormrod, 2005) and is considered relevant when the researcher engages with the real-life context of the research (Saunders et al., 2009).

The strengths of case study research are high construct validity, in-depth insights and empathy with participants (Leedy & Ormrod 2005). Approaches to ensure construct validity (Yin, 2003) include multiple sources of evidence and evidence collected and analysed through different strategies. In this research, both qualitative and quantitative data collection methods were used by adapting the convergent parallel mixed method (Creswell & Plano Clark, 2007). Details of the data collection conducted in this research are presented in section 4.4.2.2.

A case study can be used to contribute to knowledge about an organisation or associated phenomena (Yin, 2003). It is acknowledged that the research results of case studies are not generalizable to populations, but that their purpose is rather to "expand and generalize theories" (Yin, 2003:10). The case study is an empirical inquiry that examines a "contemporary phenomenon within its real-life context", especially when the contextual conditions are playing a significant role (Yin, 2003:12). The research focused on the current use of a system (LMS) and the behaviours of the participants were not manipulated in the study.

The focus of this research is on a single case as opposed to multiple cases (Yin, 2003; Leedy & Ormrod, 2005; Saunders et al., 2009). A single case study (Unisa as an ODL institution) was selected for this study. The units of analysis were the –

- context,
- user, and

- system.

These units of analysis were identified as components of the UX from Hassenzahl and Tractinsky (2006) as adopted for this study.

Unisa, as the *case* where the study was carried out, is a large African ODL university where more than 350 000 students from across South Africa, Africa and other parts of the world are enrolled (Unisa 2016c). Unisa follows an ODL model of teaching that "involves the use of blended techniques such as integrated and mixed media, and courseware with various modalities for learning development, facilitation and support. Going forward, Unisa aims to harness the immense potential of information and communications technology to provide our students with an inherently online teaching and learning experience" (Unisa, 2016c).

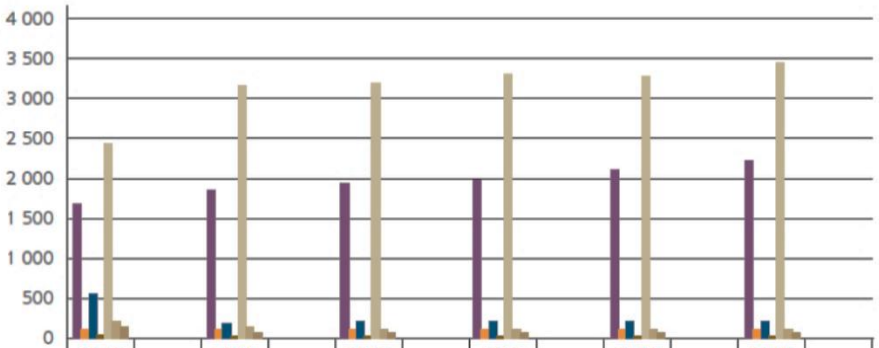
Unisa is a comprehensive, ODL institution that provides a wide variety of tuition and research opportunities. A specified objective of the University regarding enhancement of teaching processes, is offering undergraduate modules pertaining to emerging and established pedagogies that subscribe to active and collaborative learning (Unisa Council, 2016). Unisa has eight colleges where students can enrol for short courses and certificate programmes, three-and four-year degrees and diplomas for undergraduate studies. Postgraduate studies are offered up to doctoral level. These colleges encompass the following (Unisa, 2016c):

- College of Accounting Sciences (CAS): produces graduates for the various accounting professions.
- College of Agriculture and Environmental Sciences (CAES): focuses on the sustainable use and management of Africa's natural resources.
- College of Economic and Management Sciences (CEMS): the largest provider of business education in Africa and one of the largest in the world. Unisa's Graduate School of Business Leadership (SBL) is an autonomous academic department within the CEMS.
- College of Education (CEDU): responsible for the professional education and training of close to 50% of all teachers in South Africa.
- College of Graduate Studies: aims to improve masters and doctoral throughput at the University.
- College of Human Sciences (CHS): presents focused programmes in the arts and humanities, social sciences, education, religion and theology.
- College of Law (CLAW): provides access to the legal profession, including police practice.

- College of Science, Engineering and Technology (CSET): offers degrees, diplomas and certificates in a range of science, engineering and technology disciplines.

Learning involves the use of blended techniques, such as integrated and mixed media and courseware with various approaches for learning development. According to the Unisa Strategic Plan (Unisa Council, 2016) the University aims to utilise the potential of information and communications technology to provide students with the opportunity of the advantages of online teaching and learning. Since 2013 it is required that any student starting a new undergraduate degree, will have to register and successfully complete one online module (in the applicable college).

Staff by category



	2010		2011		2012		2013		2014		2015	
Instructional/Research Professional	1 689	32.3%	1 849	33.2%	1 946	34.0%	1 978	33.8%	2 115	35.4%	2 225	35.8%
Executive/Management Professional	128	2.4%	118	2.1%	124	2.2%	121	2.1%	127	2.1%	120	1.9%
Specialised/Support Professional	564	10.8%	194	3.5%	220	3.8%	228	3.9%	235	3.9%	221	3.6%
Technical	51	1.0%	21	0.4%	19	0.3%	19	0.3%	19	0.3%	21	0.3%
Non-Professional Admin	2 435	46.6%	3 164	56.8%	3 199	55.9%	3 305	56.5%	3 277	54.8%	3 439	55.3%
Crafts/Trades	215	4.1%	143	2.6%	133	2.3%	124	2.1%	125	2.1%	129	2.1%
Service Workers	148	2.8%	86	1.5%	83	1.5%	79	1.3%	77	1.3%	63	1.0%

Figure 4.2: Unisa staff as represented in the 2015 Unisa Annual Report (Unisa, 2016)

In Figure 4.2 the total staff population profile of the University is shown (Unisa, 2016c). According to the graph, in 2015 the staff listed as “Instruction/Research/Professional” consisted of 2225 staff members. This category includes the academic lecturers as a portion of this group.

Unisa is constantly updating its technological educational facilities and resources. According to the Unisa Strategic Plan (2016) the necessary ICT systems support, hardware and software infrastructure have to be in place to transform the University into an open distance e-learning (ODeL) institution. According to the inclusion of these objectives in the organisational planning, it is clear that there is an attentiveness to improve the ICT systems.

4.5 Research Method

The following elements of the research method as applied in this research are discussed in this section: population and sampling, data collection, data analysis and data verification.

4.5.1 Population and Sampling

Sampling covers the process of selecting the specific entities for the study. Ormrod and Leedy (2005) stress the importance of identifying an appropriate sample of participants from which to obtain the desired data. Sampling is the purposeful selection of individuals for the study (Creswell, 2003b). Four aspects needed to be considered in the selection of the participants which constituted the sample in the research, namely "the setting (where the research will take place), the actors (who will be observed or interviewed), the events (what the actors will be observed or interviewed doing), and the process (the evolving nature of events undertaken by the actors within the setting)" (Creswell, 2009:178). Purposeful sampling was done in order to select the distinctive expertise in the relevant area of this research during Phase 2 (Expert review of the draft conceptual framework and interviews regarding the feedback) and Phase 3 (Unisa academic staff that were targeted to answer a questionnaire). Each of these is outlined below.

4.5.1.1 **Expert Review**

During Phase 2 of the research, five experts were purposefully selected as a sample to review the working draft of the conceptual framework. The selection criteria used to identify the reviewers were according to expertise in and prior experience with online course development and facilitation, teaching and e-learning, ODL and HCI. Reviewers were selected from a variety of persons with expertise (academics) in the School of Computing, as well as one reviewer, an education consultant from the Directorate Curriculum and Learning Development at Unisa. Four of the reviewers had completed postgraduate studies in Education. All four academics from the School of Computing facilitated several courses in Computer Science or Information systems by way of the *myUnisa* LMS.

The reviewer's areas of specialisation and years of experience are depicted in Table 4.3.

Table 4.3: Information regarding expert reviewers

Re-viewer	Position & Qualification	Field of expertise					
		Academic at Unisa	LMS – *myUnisa* re Course facilitation	Experience as educator		ODL	HCI (Usability or UX)
				Teaching experience	E-learning experience		
1	Professor, PhD (Computer Science), Higher Education Diploma	15	5	25	15	10	10
2	Education Consultant, MEd	27	10	10	15	28	1
3	Senior Lecturer, MSc (Computer Science)	18	3	24	3	18	26
4	Lecturer, BSc Hons (Computer Science), Higher Education Diploma	19	10	27	10	19	0
5	Professor, PhD (Education)	4	4	23	20	4	3
		Number of Years' experience					

According to this table the accumulative years of the expertise show that the reviewers were selected from knowledge in the areas of computing, education, e-learning, ODL and HCI.

4.5.1.2 **Survey**

The focus on the UX of the academic lecturing staff motivated purposive sampling (that is intentionally non-random selection) (Creswell, 2003b; Leedy & Ormrod, 2013). From the total staff employed at Unisa, only academic lecturing staff members were targeted. Not all the academic staff members were involved with tuition (not all were involved with offering of undergraduate courses or modules). Administrative staff, support staff and ground staff that were not responsible for presenting course work to students or that did not use *myUnisa*, were excluded from the sample.

In Phase 3 of the research, the data collection was ambitious in that it attempted to include all academics staff (in other words, the whole research population) with course or student commitments at Unisa from all eight the Colleges. There were 1 640 permanent academic staff members employed at Unisa at the time. Their information and contact details were obtained from the Manager: Human Resource Information Systems (department) at Unisa. The exact number of academic lecturers involved with tuition (undergraduate or Honours modules or courses) was not

explicitly available. Consequently, the research population consisting of all permanent academic staff was targeted in the research, knowing that only a sample would respond.

4.5.2 Data Collection

The questionnaire (Appendix B) was administered through Google Maps ® over a period of two months and was administered through email, sent out to 1640 academics. A 270 out-of-office replies were received with the following responses:

- Academic lecturing staff on sick or maternity leave – 11;
- Long term research leave (usually between three and eleven months) – 68;
- Responses to report that academics are not involved with tuition – 28;
- Responses which indicated short term holiday leave or responses who did not indicate specific time or reason – 163.

The questionnaire was sent out for a second time after a month, to this last group of 163 academic staff.

A total of 158 completed questionnaires were received over a period of two months which was a reasonable number to use for the quantitative data analysis (Creswell & Plano Clark, 2007). The data collection instruments (expert review and questionnaire) included primary data collected during Phases 2 and 3 of the research and comprised of the following:

4.5.2.1 **Data collection in Phase 2**

Phase 2 of the research employed an expert review and follow up semi-structured interviews to validate the conceptual framework, which respectively entailed the following:

a) Expert Review

A working draft of the conceptual framework (Chapter 3) was sent out to the five expert reviewers via email (Appendix A). A document comprising of an informed consent form, an exposition of the purpose of the study and the explanation of the term *user experience,* accompanied the conceptual framework. The working draft of the conceptual framework comprised of the components of UX, grouped factors that could influence the UX when using technology in an ODL environment; and aspects that could influence the UX of the academic lecturer when using an LMS. For the purpose of the expert review, the working draft of the conceptual framework was supplemented with *Evaluators feedback* columns. The evaluators were requested to rate the stated factors according to their opinion on the following four rating scale: *Very important; Important; Neutral;* or *Unimportant*.

An additional column was included with an invitation to give unstructured feedback on *Conciseness and completeness of the applicable factor*.

b) Semi-structured interviews

The researcher interviewed four of the five experts (one expert was not interviewed because of illness) to discuss potential confusion or terminology and for participants to give their opinion on the applicability of the factor groupings. Interviews were conducted with the reviewers after they have read through the information which was emailed to them. The interviews were semi-structured since it was discussions of the factors and propositions stated in the draft conceptual framework. The discussions provided the researcher with the opportunity to communicate and find out if the reviewers understand and agree with the statements (TerreBlanche, Durrheim & Painter, 2006).

The experts' opinions were elicited to ensure the -

- comprehensiveness of the statements;
- correct use of language;
- applicability of factor groupings in the ODL environment;
- relevancy from the academic viewpoint; and
- content validity.

The expert review provided a rich evaluation of possible misunderstandings and interpretations of the propositions.

4.5.2.2 Data collection in Phase 3

Phase 3 of the research employed a mixed method design, as described by Creswell and Clark (2011) to collect and analyse data collected through the questionnaire. In the following narrative, the mixed method is discussed and its application to this study presented.

A mixed method design was employed to design the questionnaire and analyse the data collected through its administration. The convergent parallel design was used which proposes that quantitative and qualitative strands are implemented during the same phase of the research process (Creswell & Plano Clark, 2007). As illustrated in Figure 4.3, the quantitative and qualitative data were concurrently collected, but the two strands were kept separate and independent during the analysis. The results were only mixed during the overall interpretation at the end of the study. The reason the convergent parallel design was used in this research was in order to obtain complementary data from the same source of collection, during Phase 3 of this study. The conditions of the three units of

analysis of the research, namely the user, system and context were thus the same during the qualitative and quantitative data collection.

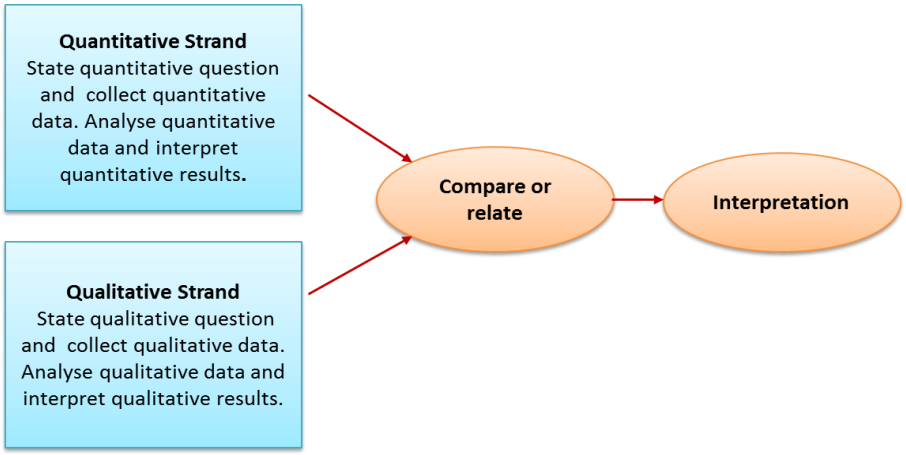


Figure 4.3: Convergent parallel mixed methods design - adapted from (Creswell & Clark, 2011)

The open-ended question in the questionnaire was used to collect qualitative data which were analysed through theme identification and presented as narratives. The questionnaire was compiled on Google Drive through Google Forms (https://www.google.com/forms) with the conceptual framework as a source of enquiry. The proposition statements from the conceptual framework were converted into questions. The questionnaire was divided as follows into two sections, A and B:

- **Section A** aimed to obtain *contextual information*. The first ten questions were asked to capture the demographics, namely college, department, discipline, number of courses offered (blended or online), gender, position at Unisa, age, number of years using the LMS for blended or online courses and level of computer skills. In the next 20 questions the participants had to indicate which of the LMS tools they were using for online or blended courses, and how often.
- **Section B** aimed to find out *how the participants perceived the LMS* while using it for facilitation of blended or online courses. This section included 45 questions using a 5 point Likert scale and its purpose was to collect the quantitative data.
    - The first group of ten questions in this section was adopted from the System Usability Scale® (Brooke 1996, 2013) and was integrated into the questionnaire in order to include a subjective usability measurement. These ten questions were modified to fit the applicable system in the case study, namely *myUnisa*.
    - The next 35 questions were generated from the propositions in the conceptual framework. Questions were asked about their interaction, assessment strategies, motivations and quality concerns. Although cognisance was taken that Bargas-Avila

and Hornbæk (2012) contend that measurement of behavioural observations of UX will enhance the validity of UX research, these aspects were not examined in this study. The reason being that the overall perceptions from users of the LMS (in this case the academic lecturers), were seen as a sufficient criterion to use in a complex system where the activities are chosen by the academics. It was therefore decided that it was sensible to evaluate the UX of the interaction with the whole system, opposed to evaluating interaction with part of it. Roto (2006) wondered that if there are numerous tasks and diverse ways in which a user could use the system, how valuable it would be to observe just one or two tasks for data collection purposes. The LMS could be utilised in many ways and the academic has a choice to extend or expand the possibilities. Therefore, it was decided to get the subjective opinions and feedback from participants regarding UX, taking into consideration the user, the system as a whole in the context of use through the user's comprehensive experience. Although the feedback from the participants was subjective, it was expected that their perceptions would reflect their reality.

  - The subjective feedback or narratives were obtained from the answers from the last question in the questionnaire which was an open ended question reading as follows: "Could you give any additional comments e.g. are there anything that keep you from utilising *myUnisa* in a better way?" Every academic has his or her prior experience, skill and emotional state to "make a unique and subjective story" (Forlizzi & Ford 2000:422). These narratives were considered a valuable source of information to understand what influences the UX of the academic lecturer when they use the LMS. That is, the perceptions and emotions of the academic's interaction with *myUnisa*, with its features and affordances in the context of an open distance university. The purpose of this question was to obtain the opinions of the participants in their own words in order to collect qualitative data. Since the participants could give anonymous feedback, it was anticipated that they could be more honest and straightforward about their experiences.

- The questionnaire was piloted with three academic lecturing staff members and reviewed by the statistician before it was sent out to the rest of the Unisa academic staff. Feedback was considered where the wording and terminology were not clear and the questionnaire was amended where necessary. This questionnaire is attached as Appendix B.
- Although not all of the academics were involved with tuition, the questionnaire were sent out to 1 640 academics in Unisa. The introduction to the survey explained the purpose of

the research and questionnaire; it stated who the researcher was, and it provided details about the ethical clearance and permissions that were obtained. The participants were informed of their right to end their participation at any time, if desired, as well as of the confidentiality and anonymity of the data analysis. In sending out the questionnaire, it was borne in mind that the return rate of completed questionnaires would be influenced by the fact that there has been an overflow of surveys sent out to academics in the last couple of years. Any survey that goes to potential participants has a cost for those participants – in time and annoyance. In order to attempt for a large response rate to the surveys, 'personalised' invitations were sent out to the academics to request completion of the survey.

4.5.3 Data Analysis (Phase 4)

The data analysis in this research took place in Phase 4 and consisted of a quantitative strand, as well as a qualitative strand, respectively entailing the following:

4.5.3.1 **The Quantitative Strand**

The quantitative research method applied in this research consisted of the statistical analysis of data collected from academic lecturers via the designed questionnaire. The quantitative data analysis in this research was aimed at the following (in answering the research questions):

- Contextualising the study by describing the biographical properties of the academic lecturers who participated in the research.
- Providing nine composite frequency tables of the response patterns of participants to nine sets of questionnaire questions that evaluate how respondents perceive each of the nine factors.
- Doing a scaled reliability test on each subset of participant responses to determine the internal consistency reliability of each of the subsets of responses.
- Calculation of perception measurements.
- Calculating the Table of means, that is overall means (averages) for all participants.

These quantitative analysis results were enlightened with the qualitative findings.

4.5.3.2 **The Qualitative Strand**

The *qualitative data analysis* is aimed at gaining an enriched understanding of the academic lecturing staff's UX when using the LMS. Qualitative analysis and interpretation aid the discovery of

underlying meanings and patterns of relationships (Creswell & Plano Clark, 2007). In keeping with the interpretive research focus, the researcher was concerned with the meaning that people give to a specific phenomenon, the *UX* of the academic lecturing staff when using the technology to deliver courses online. The qualitative data obtained further enlightened the underlying reasons attributed to certain experiences. The data provided additional information regarding the factors that are applicable in the ODL context.

Analysing the qualitative data obtained was a *subjective measurement* and involved the interpretation and coding of descriptions and statements from participants (users) which were collected through the open ended question in the questionnaire. The open ended question "*Could you give any additional comments e.g. are there anything that keep you from utilising myUnisa in a better way? We would appreciate any input (good or bad)*" was asked in such a way to invite any feedback and to find out what they thought and felt regarding their experiences or needs regarding the use of the LMS (TerreBlanche, Durrheim & Painter, 2006).

Qualitative data analysis involves coding in order to categorize and divide the data into smaller units so that it can be linked to themes (Creswell & Plano Clark, 2007). In this research, the *provisional coding* method has been applied (Saldaña, 2009) where a preliminary list of codes has been used as point of departure, with the list having been elaborated as the coding progressed. The preliminary list was derived from the conceptual framework and set out as an analytic framework (see section 5.2). This framework has been implemented as a foundation for the quantitative analysis and used as a basis for the themes in the qualitative analysis.

Caution was exercised to be open for interpretation of the data and not to be limited by the pre-coding, but to be open to alternative ways of thinking about the phenomenon under scrutiny (Saldaña, 2009). The quantitative assessment was complimented by the qualitative feedback, because quantitative assessment presents just fragments of the picture and these results are illuminated with qualitative feedback from the users of the system (Fehnert & Kosagowsky, 2008).

4.5.4 Data Verification

The multiplicity of data collection and analysis methods proposes opportunities for validating and triangulation of the research findings. Triangulation, using quantitative research methods, strengthens the confirmation of data in research findings of qualitative research (Thurmond, 2001; Hunter & Brewer, 2006). The authors argue that evidence from two or more sources is intuitively more convincing than evidence from only one (Thurmond, 2001; Hunter & Brewer, 2006).

Triangulation is the fundamental technique to validate data through cross verification from multiple sources. The intent in research is to use two or more aspects of research to increase the ability to interpret the findings e.g. see whether findings of a person's perceptions correspond with findings about their feelings (Thurmond, 2001; TerreBlanche, Durrheim & Painter, 2006). Denzin (1970) differentiate between four types of triangulation:

- **Data triangulation**, which refers to the use of different data sources in a study. It entails gathering data through several sampling strategies, so that data could be collected at different times, social situations and from a variety of people.
- **Investigator triangulation**, which refers to the use of more than one researcher in the field to gather and interpret data.
- **Theoretical triangulation**, which refers to the use of more than one theoretical position in interpreting data.
- **Methodological triangulation**, which refers to the use of more than one method for gathering data.

In this study, two of these types of triangulation were employed. Multiple data sources were used to collect data and multiple measures for data collection were employed. The triangulation in this research is therefore the validation of the conceptual framework which was evaluated by expert reviewers, the quantitative analysis and the qualitative analysis. See Figure 4.4.

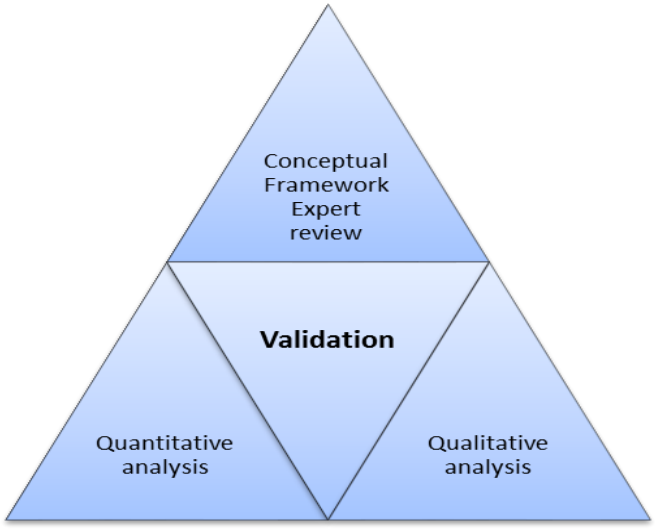


Figure 4.4: Triangulation model in this research

The quantitative and qualitative results were converged and interpreted to revise the conceptual framework.

4.5.5 Revised Conceptual Framework (Phase 5)

After the data verification has taken place in Phase 4 of this research, in the form of triangulation, the findings were presented in the revised conceptual framework towards the answering of the main research question: How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution be represented? The revised conceptual framework is presented as a result from the analysis and convergence of the quantitative and qualitative data and the representation of the findings.

4.6 Ethical Considerations

The basic purpose of research ethics is to protect the interests of research participants (TerreBlanche, Durrheim & Painter, 2006). In order to comply with the *Unisa Policy on Research Ethic*s the ethical aspects need careful consideration to ensure that the rights of the participants are protected. Researchers may undertake only such research involving human participants as has been approved by an appropriate Ethics Review Committee. Ethical clearance has thus been obtained from Unisa's College of Science, Engineering and Technology's Ethics Committee to undertake this research (Appendix C).

Ethical approval does not automatically imply permission to conduct the research using Unisa staff as participants. Therefore, an application for permission to conduct research involving Unisa staff as participants was submitted to the Senate Research and Innovation and Higher Degrees Committee chaired by the Vice Principal: Research and Innovation of the University. After this permission was granted, the candidate could proceed with the research (Appendix D).

In general terms, the following four basic *philosophical* principles are applied in research to determine whether research is ethical (Beauchamp & Childress, 2008):

- Respect for persons – this principle entails the requirement for voluntary informed consent by all participants to participate in the research, protection of individuals and confidentiality.
- Non-maleficence – no person must be harmed as a direct or indirect consequence of the research.
- Beneficence – the research must attempt to improve the benefits of the community.
- Justice – it requires that all participants be treated with fairness and equity during all stages of the research.

A framework developed by Emanuel, Wendler, Killen and Grady (2004) presents a pragmatic structure to guide (clinical) researchers in developing countries. It imbeds the four *philosophical* principles, mentioned above, but also provides the following eight *practical* principles underlying research (TerreBlanche, Durrheim & Painter, 2006): collaborative partnership, social value, scientific validity, fair selection of participants, favourable risk/benefit ratio, independent ethical review, informed consent and on-going respect for participants and study communities. The principles with the explanation of their meaning and how they are applied in the current research are set out in Table 4.4.

Table 4.4: The ethical principles applied in this research

Principle	Explanation	How it has been applied in this research
Collaborative partnership	The research conducted must be in collaboration with the intended population.	The research was conducted at Unisa which is the setting of the case study. The participants were the academics in Unisa.
Social value	The research should lead to knowledge and/or interventions that have value to the participants. It also implies that the community where the research intervention is taking place should benefit from the outcome of the study if the intervention was effective.	The researcher aimed to advise *myUnisa* stakeholders on how to improve the LMS.
Scientific validity	The design, methodology and data analysis should be justifiable, feasible and lead to valid answers to the research questions.	The applicable methods in this research were explained in this chapter (Chapter 4) and the required analysis standards have been applied.
Fair selection of participants	The chosen population should be those to whom the research question applies.	The selected population for this research was the academic lecturing staff from Unisa. The questionnaire was sent to academic lecturing staff at Unisa.
Favourable risk/benefit ratio	The possible risks or harm should be identified beforehand.	The researcher did not find any reason why participants would be harmed through the research intervention.
Independent ethical review	An independent and competent research ethics committee should do the ethical review before the data collection process may begin.	The researcher obtained ethical clearance from the Ethics Review Committee, the Unisa College of Science, Engineering and Technology's Ethics Committee (Appendix C).
Informed consent	It is essential to provide participants with appropriate information; participants must be able to understand the information; the participant must not be obliged to take part or complete the participation; informed consent must be provided in writing to all participants.	The researcher provided Informed consent in all three the interventions where participants took part in the review and data collection.
On-going respect for participants and study communities	Participants must be treated with respect and their personal information remains confidential. It has become essential that the relevant community	In this research all answers from participants were analysed collectively. Individual answers were therefore not linked to any names of participants. The

	should have access to the research results	participant's contributions were appreciated and participants were handled with respect.

There could be doubts from participants that disclosure of their identity would harm their position or future in the institution where the case study was conducted. Therefore, the importance and application of the ethical procedures are discussed in this section. This also included the declaration by the researcher, that the participant's data will be anonymous and confidential, meaning that no one should be able to identify any participant.

4.7 Summary

This chapter outlined the research design followed in this study to answer the research question formulated as follows:

> ***How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution, be represented?***

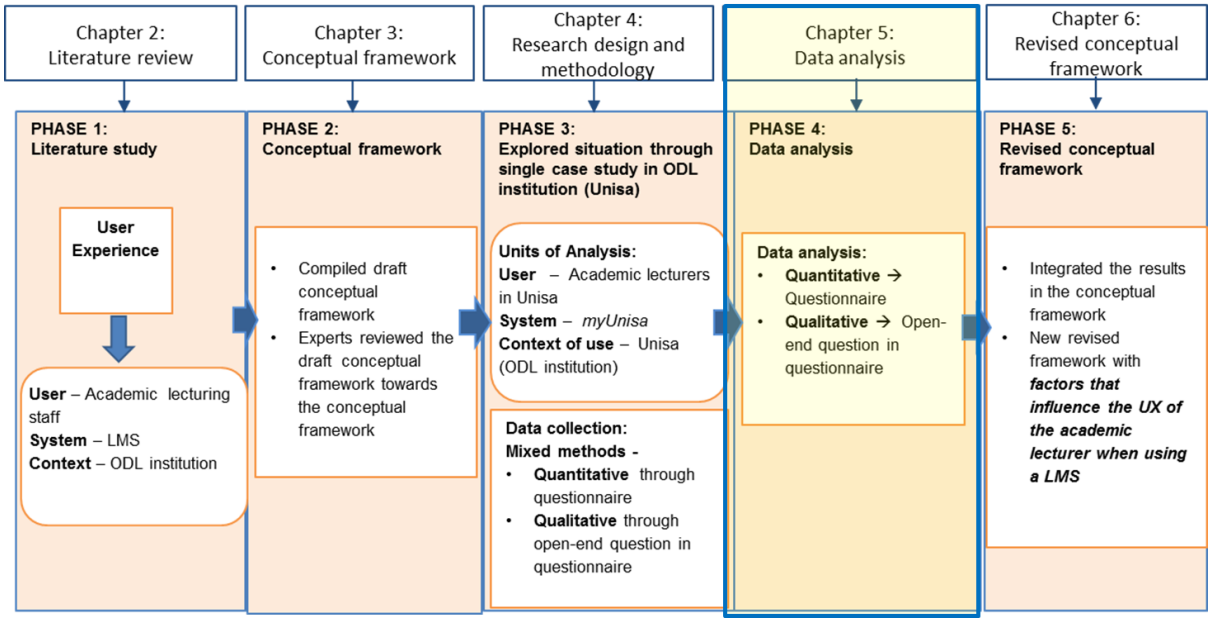
It proposes the research process to present a framework that represents the UX of academic lecturing staff in the use of an LMS tool in an ODL institution.

In this chapter the research process, research philosophy, research strategy and data collection methods and data analysis techniques applied in this research were discussed. As explained in the chapter, this study adopted an interpretivistic research philosophy and applied a single case study as a research strategy. Both qualitative and quantitative data were collected by adapting the convergent parallel mixed method.

In Chapter 5 the analysis of the data collected in this research are outlined.

CHAPTER 5: DATA ANALYSIS

CHAPTER CONTENT:



5.1 Introduction

The main research question guiding this study was formulated as follows:

How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution be represented?

The sub research questions supplementing the research question are the following:

Sub research question 1: ***What are the components of the UX when using an LMS?***

Sub research question 2: ***What are the factors that will influence the UX when using the LMS in an ODL institution?***

The first sub research question was answered with the literature review (Phase 1, Chapter 2) and the answer to the second sub research question commenced through the presentation of the conceptual framework in Phase 2; Chapter 3. In the following sections, these components and factors are examined within the context of Unisa as the case study. This contextualisation of the components and their associated factors enabled the articulation of the *factors that influence the UX of academic lecturers when using the LMS at Unisa as an ODL institution*.

Specific factors (that affect UX) have been identified in the literature and independent researchers have acknowledged these factors. In the current research it was therefore assumed that factors affecting UX exist. These factors are defined in this research to indicate how this research confirms these factors. It is furthermore reasoned that a measuring instrument could be designed to measure academics' perception of the effect of these factors on UX - based on the factors identified in the literature.

Based on this reasoning and on the data collected from academic lecturers via the data collecting instrument designed for this research, in the form of a questionnaire (Appendix B), the quantitative analysis strategy for this research entailed the following:

- The background of the research was outlined to contextualise the study by describing the biographical properties of the research participants that participated in the research (see section 5.3.1).
- Various factors were introduced that have been evaluated in the questionnaire (see section 5.3.2 – section 5.3.5).
- The analysis proceeded by doing a scaled reliability test on each subset of participant responses, to determine the internal consistency reliability of each of the subsets of responses (each of the nine identified UX factors) (see section 5.3.6).

- The calculation of perception measurements (scores) was done. These scores were used to evaluate perceptions by calculating *Tables of means* (averages) for all participants. This was calculated for each of the nine factors – providing a measure of positive or negative perceptions (see section 5.3.7).
- These quantitative analysis results were enlightened with the qualitative findings (see section 5.3.8).

From the three units of analysis for the case study, namely the user, the system and the context, nine primary categories of factors were identified from the draft conceptual framework. These categories are displayed in the analytical framework (see section 5.2).

This chapter presents the exploratory description, findings and analysis of the nine embedded primary categories with regards to the factors, complementary to the three units of analysis of the case study, by attending to the analytic framework, quantitative analysis, qualitative analysis and the convergence of the quantitative and qualitative results.

5.2 Analytic Framework

An analytical framework is the list of proposed key factors or themes that characterises the phenomena as derived from the conceptual framework (Gale, Heath, Cameron, Rashid & Redwood 2013). The factors are grouped together because they correspond to a specific unit of analysis within the case of Unisa as an ODL institution. This classification given in Table 5.1 aided in simplifying the data analysis.

Table 5.1: The analytic framework as the coding scheme

UX components from literature	Coding	Factors that could influence the UX when using an LMS
User	U1	The academic has certain *needs* when facilitating courses in an online environment
	U2	The *skills* of the academic could influence the UX when using the LMS
	U3	The academic's mood, perspective, characteristics, etc. could influence the UX
System	S1	*Pragmatic* quality: The (technical) usability of the system (LMS)
	S2	The pedagogical *appropriateness* of the system (LMS)
	S3	*Hedonic* quality: Pleasure and attractiveness
Context of use	C1	Organisational: The ODL context strategies; development/training support
	C2	Institutional administrative and structural procedures
	C3	*Technical*: *Available technologies* to be used with *myUnisa* such as multimedia and collaborative toolsets in a distributed web-based environment, OER. Technical support to use these technologies.

The factors are grouped in the case study units of analysis, which have been assigned codes that could be used to manage and organise the data. The purpose of this analytic framework serves as a

heuristic to analyse given phenomena of factors that could influence the UX when using an LMS. As summarised in Table 5.1, the framework classifies the constructs and aids the systematic evaluation of the data. In subsequent sections presented, the colours used in Table 5.1 as follows denote the focus on the components: the user (pink), the system (purple) and the context of use (green).

5.3 Quantitative Analysis

The quantitative research method in this study consisted of the statistical analysis of data collected from academic lecturers via the questionnaire designed for this research (compare section 4.6). The questionnaire consisted of ten demographic questions (Section A in the questionnaire, see section 4.5.2) which were aimed to find out what the backgrounds of the participants were. The software packages Statistical Analysis System (SAS) ®, IBM Statistical Package for the Social Sciences (SPSS) ® and MS Excel® were used for analysis and visualisation of the quantitative data. When doing a quantitative analysis, it is important to also do an exploratory analysis to explain the contextual circumstances of the study (TerreBlanche, Durrheim & Painter, 2006).

The quantitative analysis is firstly enlightened with section 5.3.1, the exploratory analysis. Section 5.3.1.1 examines the biographical properties of the study participants together with section 5.3.1.2 that looks at the extent of utilisation of the LMS. In section 5.3.2 to section 5.3.4 the perceptions of the academic lecturers regarding the use of the LMS are investigated considering the different factors as presented in Table 5.1.

The internal consistency reliability of each of the subsets of responses was done in section 5.3.6, the calculation of perception measurements (scores) was done in section 5.3.7 where after the analysis of the quantitative findings was discussed in section 5.3.8.

5.3.1 Exploratory Analysis

In this section the background of the research to contextualise the study is displayed by describing the biographical properties of the research participants that participated in the research. As part of the biographical properties, an argument is, for example made that the number of blended learning tools participants use, indicates how apt they were in facilitating online learning. An indicator of the extent of blended learning implementation was, therefore, calculated as an additional biographical property of the participating academics.

The frequency distributions of the biographical properties of the participants in terms of colleges, age, gender, period of use of *myUnisa*, job position at Unisa, computer skills and number of under-graduate and post-graduate courses facilitated via the LMS, entailed the following:

5.3.1.1 **Participants' biographical properties**

As presented in Figure 5.1, the most participants were distributed across all the colleges at Unisa, but the majority came from five colleges, namely the College of Science, Engineering and Technology (38), College of Economic and Management Sciences (33), College of Human Sciences (33) , College of Law (21) and College of Agriculture and Environmental Sciences (14). This variation was valuable since it was necessary to obtain input from different discipline pedagogies.

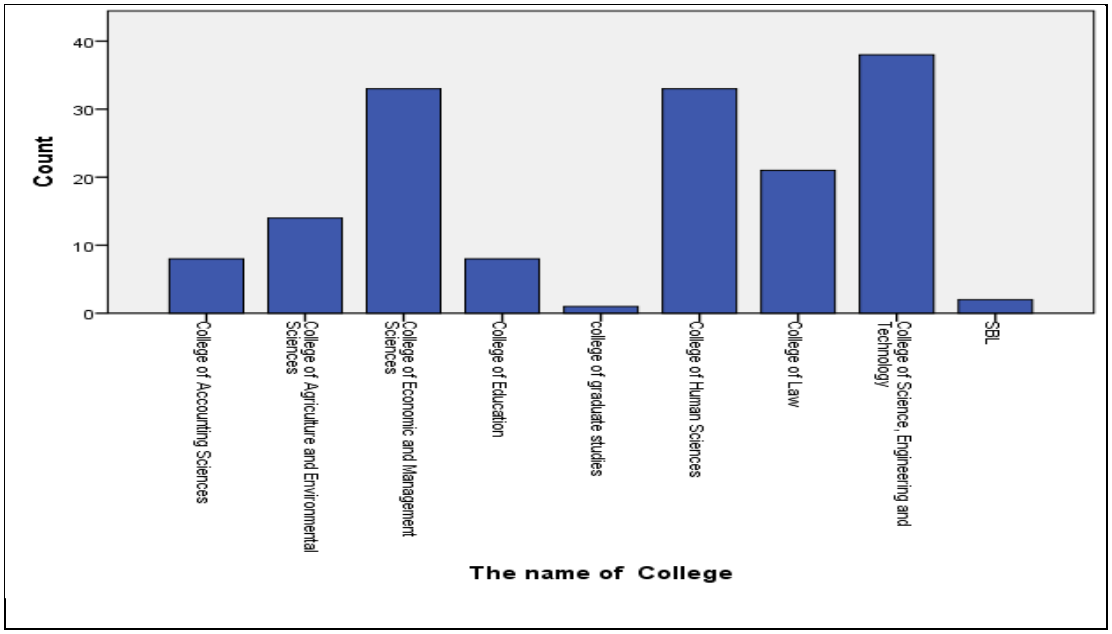
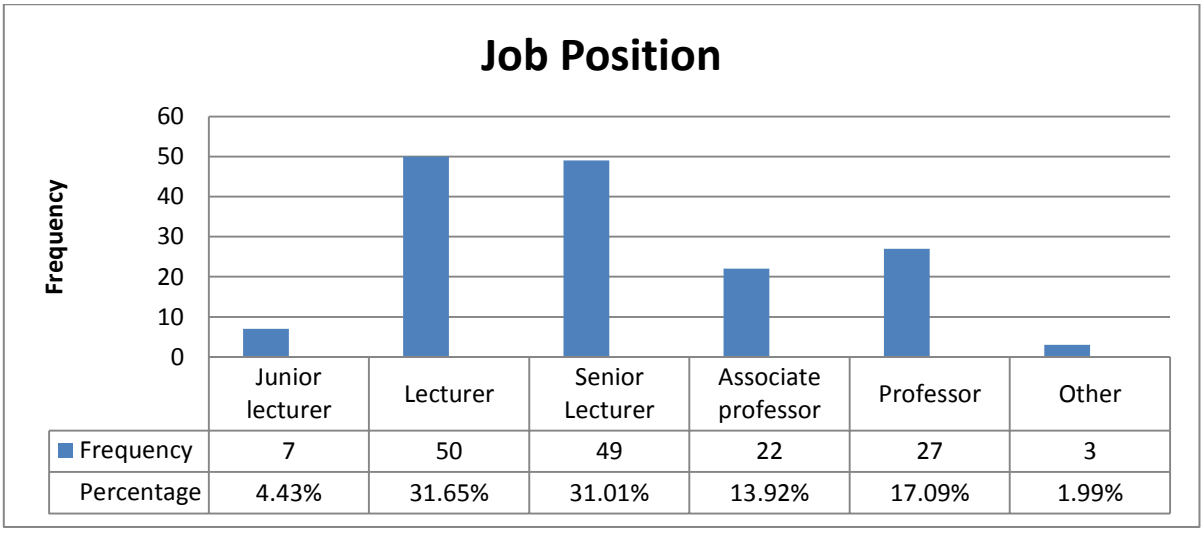


Figure 5.1: Distribution of participants through eight colleges in Unisa (SBL is part of CEMS)

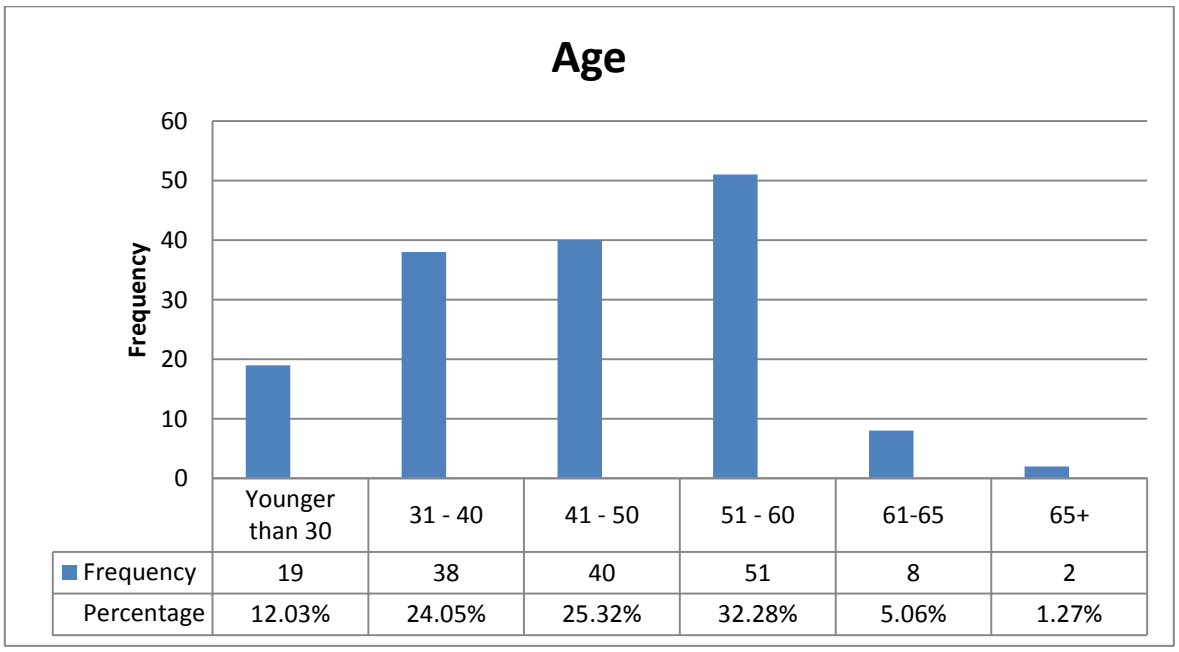
Figure 5.2 shows that of the participants, about 63% academic lecturers in the positions as lecturers and senior lecturers were mostly representative, while 31% were associate professors or professors.



	Junior lecturer	Lecturer	Senior Lecturer	Associate professor	Professor	Other
Frequency	7	50	49	22	27	3
Percentage	4.43%	31.65%	31.01%	13.92%	17.09%	1.99%

Figure 5.2: Distribution of participants in various job positions

The participants' age distribution is depicted in Figure 5.3 and shows that the majority age groups were between the ages of 31 and 60 years (82% collectively).



	Younger than 30	31 - 40	41 - 50	51 - 60	61-65	65+
Frequency	19	38	40	51	8	2
Percentage	12.03%	24.05%	25.32%	32.28%	5.06%	1.27%

Figure 5.3: Distribution of participants according to age

From observation in Figure 5.4 it can be said that most of the participating academic lecturers (82%) had more than one year experience with the use of the LMS, *myUnisa*.

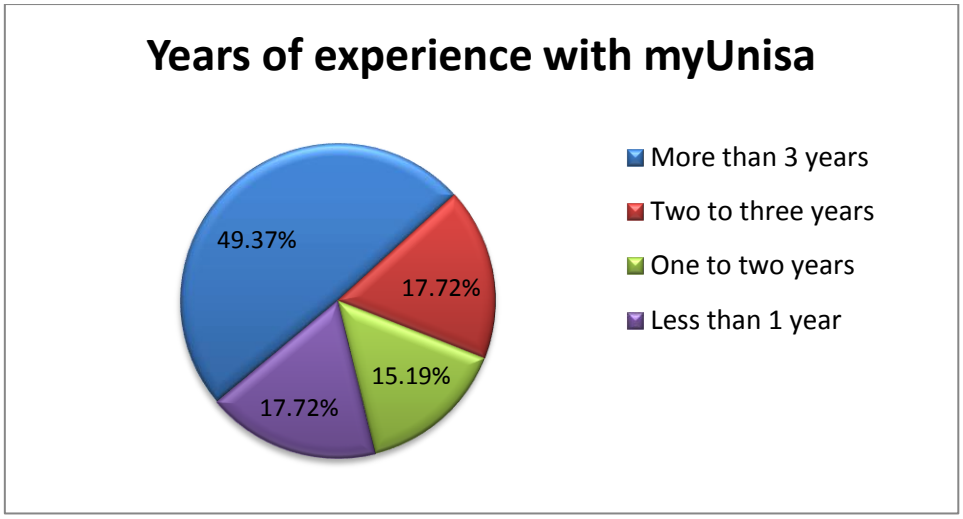


Figure 5.4: Distribution of participants according to years of experience with *myUnisa*

As displayed in Table 5.2, the majority of the participating academic lecturers (73%) rated themselves as being highly skilled in the use of computers. Another 26% rated themselves as average and only one academic rated him/her as a novice user.

Table 5.2: Distribution of participants' level of computer literacy

Computer Skills	Frequency	%
Novice: I battle to perform electronic tasks expected of me	1	0.63
Average: I cope with general computer tasks	42	26.58
High: I perform specialized tasks and learn new skills by myself	99	62.66
Very high: I do complex computer programming or other specialized tasks and solve my own computer problems	16	10.13

5.3.1.2 Participants' blended learning indicator

In this section a blended learning indicator for participants is calculated. This is also regarded as a biographical property of participants.

The academic lecturers had to indicate the tools they were using in their 'most online' course as follows by means of the 5 point Likert scale: "Not at all, Rarely, Sometimes, Often or Always ". The aim herewith, was to discover what tools were actually used by the academic lecturers who declared that they facilitated course(s) by means of the LMS for blended or online learning.

Of interest to this research is the *Chi-square* test for the two-way classification, for example blended learning tools (1 to 20 different tools) and participants frequency-preference of use (5 use-levels) (Howell, 1999). The *two-way Chi Square* is a convenient technique for determining the significance of the difference between the frequencies of occurrence in two or more categories (5 use-levels) with two or more groups (in this instance it is 20 tool types). The probability of a *Chi-square* statistic assuming the value of 1 109.39 under the null hypothesis that the frequency-of-use pattern for all blended learning tools are the same, is <0.0001***. This is statistically significant on the 0.1% level of significance (with 76 *df*). Therefore, the alternative hypothesis can be accepted that some frequency-of-use response patterns of blended learning tools differ statistically significantly from others.

The extent to which the *myUnisa* tools are being utilised by participants, is set out in Table 5-3.

Table 5.3: Indication to what extent the *myUnisa* tools are being utilised by participants

LMS Tools for Blended/Online learning						
Blended tools	**Frequency of use of tools**					
Frequency	**Not at all**	**Rarely**	**Sometimes**	**Often**	**Always**	**Total**
Additional resources	4	12	34	38	70	158
Announcements	1	0	16	47	94	158
Blogs	91	34	20	5	8	158
Discussion forums	9	8	23	35	83	158
Discussions	29	16	26	29	58	158
FAQs	46	30	31	21	30	158
Glossary	80	36	25	6	11	158
Grade book	103	25	13	7	10	158
Learning units	32	13	20	37	56	158
Meetings	100	32	14	8	4	158
News	105	22	14	11	6	158
Podcasts	101	22	16	13	6	158
Questions and answers	67	33	28	15	15	158
Schedule	53	25	23	22	35	158
Self-assessment	50	25	31	22	30	158
Statistics	48	18	35	29	28	158
Syllabus	72	29	23	18	16	158
Web content	69	25	25	19	20	158
Wiki	108	18	22	6	4	158
Course contact	31	21	26	41	39	158
Total	1199 37.94	429 13.58	465 14.72	623 19.72	444 14.05	3160 100.00
Chi-square statistic = 1109.39***[2]						

Table 5.3 shows that the tools Additional resources, Announcements, Discussion forums, Discussions, Learning Units and Course contacts are most frequently used by the participants. According to the CPD's classification of 'online or blended' learning at least three of the tools in the given list in Table 5.4 are to be used in the offering of a given course (Louw et al. 2013). If frequent use is considered by acceptance of the responses 'Often' and 'Always', Additional resources

[2] Legend for statistical significance:

* : statistically significant on the 5% level of significance (associated F-probability is =/< 0.05)

** : statistically significant on the 1% level of significance (associated F-probability is =/< 0.01)

*** : statistically significant on the 0.1% level of significance (associated F-probability is =/< 0.001)

For example, the probability that the Chi-square statistic assumes the value of 395.70 under the null hypothesis that frequency response patterns for the different questions do not differ statistically significantly is <0.001. Therefore, highly significant on the 0.1% level of significance (***).

(68.35%), Discussion forums (74.68%) and Learning Units (58.86%) are the tools that were frequently utilised by the participants.

Table 5.4: The utilisation of *myUnisa* tools that are regarded as a necessity for blended learning

	Blended/Online learning					
Tool	**Not at all**	**Rarely**	**Sometimes**	**Often**	**Always**	**Total**
Additional resources	4 2.53%	12 7.59%	34 21.52%	38 24.05%	70 44.30%	158
Blogs	91 57.59%	34 21.52%	20 12.66%	5 3.16%	8 5.06%	158
Discussion forums	9 5.70%	8 5.06%	23 14.56%	35 22.15%	83 52.53%	158
FAQs	46 29.11%	30 18.99%	31 19.62%	21 13.29%	30 18.99%	158
Grade books	103 65.19%	25 15.82%	13 8.23%	7 4.43%	10 6.33%	158
Learning units	32 20.25%	13 8.23%	20 12.66%	37 23.42%	56 35.44%	158
Podcasts	101 63.92%	22 13.92%	16 10.13%	13 8.23%	6 3.80%	158
Q&A	67 42.41%	33 20.89%	28 17.72%	15 9.49%	15 9.49%	158
Self-assessment	50 31.65%	25 15.82%	31 19.62%	22 13.92%	30 18.99%	158
Wiki	108 68.35%	18 11.39%	22 13.92%	6 3.80%	4 2.53%	158
Total	611	220	238	199	312	1580
Chi-square = 589.24* **						

In order to calculate a blended learning indicator for participants, it was reasoned that the higher summative value a participant scores for these tools (i.e. Additional resources, Blogs, Discussion forums, FAQs, Grade books, Learning units, Podcasts, Q&As, Self-assessment and Wiki), the higher his or her use is of these tools in their implementation of on-line learning. The indicator of 'blended learning' application is presented in Table 5.5. In this research, the extent of blended learning implementation of academic lecturers was such that almost 26% of the participants indicated a high level of blended learning implementation.

A possible way to measure blended learning is to calculate the cumulative frequency of the tools used by participants. The summative totals are counted as follows: If a participant has given each of the blended learning tools (namely additional resources, blogs, discussion forums, FAQs, grade books, learning units, podcasts, Q&As and self-assessment) a rating of "1" (which indicates that the tool is 'not at all' used), the cumulative total would be 10, which is thus the minimum total. If a participant has given 9 of the blended learning tools a rating of "1" and one tool the rating of "2" (which indicates that it is 'rarely' used) the cumulative total would be 11. As mentioned earlier,

according to the CPD's classification the ideal for 'blended' learning, is that at least three of the tools in the given list are to be used in the offering of the course (Louw et al. 2013). Therefore, the assumption could be made that at least three of the tools should be rated as "4" (which indicates that it is 'often' used) or "5" (which indicates that it is 'always' used). The cumulative total of a participant would thus have to be at least 10 + (4 x 3) = 22.

Table 5.5 shows how summative scores were distributed for the participants in this research. This lead to categories of the indicator being defined as 'low blended learning' (1-16 summative rating score); moderate blended learning implementation' (summative score of 17-26); and 'high blended learning implementation' (summative score of 27-35).

Table 5.5: Cumulative frequency of the utilisation of 10 *myUnisa* tools

Cumulative rating for Blended Learning Tools	Frequency	Percentage	Cumulative Frequency	Cumulative Percentage
10	1	0.63	1	0.63
11	1	0.63	2	1.27
13	1	0.63	3	1.90
15	3	1.90	6	3.80
16	5	3.16	11	6.96
17	3	1.90	14	8.86
18	4	2.53	18	11.39
19	8	5.06	26	16.46
20	4	2.53	30	18.99
21	8	5.06	38	24.05
22	10	6.33	48	30.38
23	9	5.70	57	36.08
24	15	9.49	72	45.57
25	11	6.96	83	52.53
26	8	5.06	91	57.59
27	8	5.06	99	62.66
28	4	2.53	103	65.19
29	8	5.06	111	70.25
30	7	4.43	118	74.68
31	8	5.06	126	79.75
32	6	3.80	132	83.54
33	3	1.90	135	85.44
34	6	3.80	141	89.24
35	4	2.53	145	91.77
36	4	2.53	149	94.30
40	4	2.53	153	96.84
41	1	0.63	154	97.47
42	2	1.27	156	98.73
43	1	0.63	157	99.37
44	1	0.63	158	100.00

5.3.2 Perceptions of the Academic Lecturers regarding the Use of the LMS

Section B in the questionnaire (see section 4.5.2) aimed to find out how the participants perceived the LMS while using it for the facilitation of blended or online courses. This section included 45 questions using a 5 point Likert scale. Its purpose was to collect the quantitative data. The factors that have been evaluated in the questionnaire are presented below. These factors, as have been identified in the literature (compare section 5.2), were evaluated to establish how participants perceived the interaction with the LMS (the UX of using *myUnisa,* the LMS system of the particular ODL institution).

The nine factors are presented as follows:

- By providing nine composite frequency tables of the response patterns of participants to nine sets of questionnaire questions that evaluated how respondents perceived each of the nine factors. In other words, groups of questions were used to probe each of the nine factors.
- The response patterns of the nine tables are each discussed briefly. The purpose of the discussion was to indicate whether participants generally perceived the factors as having an influence (positive or negative) on UX.
- Once the nine factors were introduced, the analysis proceeded to do a scale reliability test on each subset of participant responses to determine the internal consistency reliability of each of the nine subsets of responses. The question might well be asked why this was necessary. Before a perception measure for each of the nine factors could be calculated (for each participant), research had to determine whether such a perception measure of a specific factor would be reliable. Internal consistency reliability tested whether all items within a group of questions all contributed towards explaining a central or common concept (e.g. usability). Once this was established, the analysis could proceed to calculate perception measures from each subset of responses to a group of questions. As part of the scale reliability tests (the tests that evaluate internal consistency reliability) a value is usually calculated here. This value is referred to as a Cronbach alpha (Howell, 1999). If the value of a Cronbach alpha is greater than, or in the region of 0.7, it can be assumed that internal consistency reliability has been established for a particular factor (the literature often refers to such a concept – for example ‘usability’, as a construct).

- Once the internal consistency reliability for each of the nine UX factors was verified, the analysis could proceed with the calculation of perception measurements. These measurements are referred to as 'scores' and can be calculated as the average rating response to a group of questions that describe the UX factors for each participant. The scores entail the following:
    - In this case the scores measured how every participant perceived each factor to affect the UX of the academic lecturers. The score values were interpreted in the same way as the rating scale of the questionnaire. For instance, a value close to '1' indicated disagreement or negative perceptions, and values closer to '5' agreement or positive perceptions.
    - These scores could then be used to evaluate perceptions by calculation of Tables of means – this provided a first measure of positive or negative perceptions.

The composite frequency tables presented in this section indicate how the participants in general felt regarding each factor.

5.3.3 User

The quantitative analyses and results for the user's concepts are discussed in the following sections. Section 5.3.3.1 presents the analysis of the academic lecture's needs, section 5.3.3.2 shows the analysis of the skills of the academic lecturer and section 5.3.3.3 presents the analysis of the academic lecture's mood and attitude.

5.3.3.1 **User - The academic lecturer has certain needs**

The perceptions of participants regarding User needs when using the LMS are listed in Table 5.6. Table 5.6 indicates (last row of the table) that the majority of rating responses to the 11 questions (that probed perceptions of academic lecturers needs when facilitating online learning) fell towards the '4' and '5' rating scores (in total 927 of 1 722 or 54% of the participants) In other words, since the '4' and '5' rating values indicate 'strongly agree' and 'agree' perceptions, this translates into academic lecturers that definitely or strongly expressed that they had needs when facilitating online learning. This suggests that *academic needs* affect UX. This statement is based on a comparison with the total '1' and '2' rating responses recorded in this table, namely 339 responses in total or 19.6% of the participants. This means that more participants indicated that they agreed that the academic has needs when facilitating online learning, than those who indicated disagreement with having

needs when facilitating online learning. Thus, according to the responses of the participants, the majority experienced that the LMS 'often or always' fulfilled their needs.

The two-way Chi-square tested, for example all questions regarding the user needs when facilitating courses (11 questions in this instance) and the participant's perception preference of choice (5 use-levels) was used. The two-way Chi Square technique determined the significance of the difference between the frequencies of occurrence in two or more categories (5 use-levels) with two or more groups. The probability of a Chi-square statistic assuming the value of 395.70, under the null hypothesis that the perception pattern for users' needs, were the same, namely <0.0001***, which is statistically significant on the 0.1% level of significance (with 76 df).

Table 5.6: Perceptions regarding User needs when using the LMS

Factor - U1: The academic has certain *needs* when facilitating courses in an online environment							
Question		Not at all	Rarely	Some-times	Often	Always	Total
Q 1.9 I feel confident when I am using *myUnisa*	Quantity	0	10	33	64	51	158
	%	0.00	6.33	20.89	40.51	32.28	
Q 2.2 I can independently facilitate online learning via *myUnisa*	Quantity	9	13	51	57	28	158
	%	5.70	8.23	32.28	36.08	17.72	
Q 2.3.1 I feel connected to on-line course students when facilitating learning via *myUnisa*	Quantity	10	25	55	47	20	157
	%	6.37	15.92	35.03	29.94	12.74	
Q 2.3.2 I feel connected to colleagues when facilitating learning via *myUnisa*	Quantity	35	41	50	26	5	157
	%	22.29	26.11	31.85	16.56	3.18	
Q 2.4 I find pleasure in mastering the intricacies of *myUnisa*	Quantity	13	23	44	53	22	155
	%	8.39	14.84	28.39	34.19	14.19	
Q 2.5 I feel that *myUnisa* enables me to be creative and innovative when I facilitate online learning	Quantity	17	25	49	48	19	158
	%	10.76	15.82	31.01	30.38	12.03	
Q 2.6 I am skilled in the *myUnisa* tools that support online learning	Quantity	2	15	40	68	30	155
	%	1.29	9.68	25.81	43.87	19.35	
Q 2.7 I have the knowledge to choose the correct instructional methodologies to facilitate online learning via *myUnisa*	Quantity	5	18	49	62	20	154
	%	3.25	11.69	31.82	40.26	12.99	
Q 2.8 I need professional development interventions to enhance my online-facilitation skills	Quantity	22	35	38	37	22	154
	%	14.29	22.73	24.68	24.03	14.29	
Q 2.14 *myUnisa* has to be functionally adequate for me, as lecturer, to accomplish the necessary on-line learning facilitation tasks	Quantity	3	8	32	56	59	158
	%	1.90	5.06	20.25	35.44	37.34	
Q 2.15 I am not afraid to use technology	Quantity	1	9	15	45	88	158
	%	0.63	5.70	9.49	28.48	55.70	
Total		117	222	456	563	364	1722
	Frequency Missing = 16 Chi-square = 395.70***						

5.3.3.2 **User - The skills of the academic lecturer**

Table 5.7 indicates that the majority of rating responses to the 9 questions that explored if the academic lecturers perceived that their skills influence the UX when facilitating online learning, fell towards the '4' and '5' rating scores (in total 854 of 1 415 or 60% of the participants). In other words, since the '4' and '5' rating values indicate 'strongly agree' and 'agree' perceptions, this show that participants indicated that they thought that their skills influenced facilitating online learning. This suggests that academic skills affect UX. This interpretation is based on a comparison with the total '1' and '2' rating responses recorded in this table, with 177 responses in total, or 12.5% of the participants. Thus, more participants indicated that they agreed that the academic's level of skills have an influence when facilitating online learning, than those who indicated disagreement that skills do not influence their experience when facilitating online learning.

Table 5.7: Perceptions how user skills could influence UX

Factor U2: The skills of the academic could influence the UX when using the LMS							
Question		Not at all	Rarely	Some-times	Often	Always	Total
Q 2.2 I can independently facilitate online learning via *myUnisa*	Quantity	9	13	51	57	28	158
	%	5.70	8.23	32.28	36.08	17.72	
Q 2.6 I am skilled in the *myUnisa* tools that support online learning	Quantity	2	15	40	68	30	155
	%	1.29	9.68	25.81	43.87	19.35	
Q 2.7 I have the knowledge to choose the correct instructional methodologies to facilitate online learning via *myUnisa*	Quantity	5	18	49	62	20	154
	%	3.25	11.69	31.82	40.26	12.99	
Q 2.9 I have aligned my conventional teaching methods to methods suitable for the facilitation of online learning	Quantity	2	20	49	64	23	158
	%	1.27	12.66	31.01	40.51	14.56	
Q 2.10 I have the skills to follow ODL strategies when using *myUnisa*	Quantity	6	14	47	66	25	158
	%	3.80	8.86	29.75	41.77	15.82	
Q 2.11 I have the skills to use available media and technologies for enhancement of facilitation of my online teaching	Quantity	2	19	42	71	24	158
	%	1.27	12.03	26.58	44.94	15.19	
Q 2.13 I am informed on the affordances of *myUnisa* for the facilitation of on-line or blended learning	Quantity	9	23	66	49	11	158
	%	5.70	14.56	41.77	31.01	6.96	
Q 2.15 I am not afraid to use technology	Quantity	1	9	15	45	88	158
	%	0.63	5.70	9.49	28.48	55.70	
Q 2.16 I have enough practical experience with the technology to use *myUnisa* effectively	Quantity	0	10	25	64	59	158
	%	0.00	6.33	15.82	40.51	37.34	
Total		36	141	384	546	308	1415
	Frequency Missing = 7 Chi-square = 220.41***						

5.3.3.3 User - The academic lecture's mood and attitude

As shown in Table 5.8 the majority of rating responses to the 8 questions that explored if the academics' mood or attitudes influence the UX when facilitating online learning, fell towards the '4' and '5' rating scores (in total 586 of 1 264 or 46% of the participants). In other words, since the '4' and '5' rating values indicate 'strongly agree' and 'agree' perceptions, this shows that academic lecturers indicated that they do think that their mood or attitudes influence their facilitating of online learning. This implies that academic mood or attitudes affect UX. This interpretation is based on a comparison with the total '1' and '2' rating responses recorded in this table, namely 251 responses in total or 19.8% of the participants. Thus, more participants indicated that they agreed that the academic's mood or attitudes have an influence when facilitating online learning than those who indicated disagreement that mood or attitudes do not influence their experience when facilitating online learning.

Table 5.8: Perceptions how the user mood and attitude could influence UX

Factor U3: The academic's mood and attitude could influence the UX							
Question		Not at all	Rarely	Some-times	Often	Always	Total
Q 2.12 I am positive that *myUnisa* is a suitable tool to facilitate on-line or blended learning	Quantity %	10 6.33	19 12.03	50 31.65	59 37.34	20 12.66	158
Q 2.15 I am not afraid to use technology	Quantity %	1 0.63	9 5.70	15 9.49	45 28.48	88 55.70	158
Q 2.17 I enjoy using *myUnisa* even if I am not in a good mood	Quantity %	9 5.70	19 12.03	60 37.97	50 31.65	20 12.66	158
Q 2.25 It is an enjoyable and fun experience to work on *myUnisa*	Quantity %	10 6.33	29 18.35	60 37.97	48 30.38	11 6.96	158
Q 2.32 I feel positive towards *myUnisa* because of good quality training and support in online activities and interaction tools available to academics	Quantity %	5 3.16	29 18.35	64 40.51	52 32.91	8 5.06	158
Q 2.33 I feel positive towards *myUnisa* because training and support in online activities and interaction tools are available to academics when needed	Quantity %	5 3.16	32 20.25	54 34.18	58 36.71	9 5.70	158
Q 2.34 My experience of the development opportunities for academics to use *myUnisa* is positive	Quantity %	9 5.70	22 13.92	59 37.34	51 32.28	17 10.76	158
Q 2.35 I experience *myUnisa* in a positive light because access to media tools (e.g. graphics, OER, sound, podcasts, etc.) required to facilitate online learning is readily available	Quantity %	15 9.49	28 17.72	65 41.14	38 24.05	12 7.59	158
Total		64	187	427	401	185	1264
	Chi-square = 288.95***						

5.3.4 System

The quantitative analyses and results for the system concepts are considered in the following sections. Section 5.3.4.1 shows the analysis of the pragmatic quality or usability of the system, section 5.3.4.2 explains the analysis of the pedagogical appropriateness of the system and section 5.3.4.3 presents the analysis of the system's hedonic quality.

5.3.4.1 **System - Pragmatic quality: The usability of the system**

Table 5.9 shows the rating responses to the 24 questions that tested how the academic lecturers perceived the *pragmatic quality of the system.* The ten questions from the SUS ® questionnaire that were modified to fit the applicable system in the case study were included in this set of 24 questions. The questions aimed to find out how the usability of the system was perceived by the academic lecturers when facilitating online learning. The rating scores fell towards the '4' and '5' (in total 1 708 of 3 743 or 45.6% of the participants). In comparison, the total '1' and '2' rating responses recorded in this table numbered 936 responses in total, or 25% of the participants. In other words, since the '4' and '5' rating values indicated 'strongly agree' and 'agree' perceptions, this shows that academic lecturers indicated that the usability of the system influences facilitating online learning and thus suggests that pragmatic quality affect UX.

Table 5.9: How the pragmatic quality could influence the UX

Factor S1: Pragmatic quality: The usability of the system							
Question		Not at all	Rarely	Some-times	Often	Always	Total
Q1.1 I enjoy using *myUnisa*	Quantity% Quantity%	5 3.16	8 5.06	56 35.44	56 35.44	33 20.89	158
Q1.2n I find *myUnisa* unnecessary complex	Quantity% Quantity%	23 15.13	30 19.74	61 40.13	38 25.00	0 0.00	152
Q 1.3 I think *myUnisa* is easy to use	Quantity% Quantity%	9 5.70	14 8.86	38 24.05	59 37.34	38 24.05	158
Q 1.4n I need technical support to use *myUnisa*	Quantity% Quantity%	12 7.79	29 18.83	40 25.97	73 47.40	0 0.00	154
Q 1.5 I find the functions in *myUnisa* are well integrated	Quantity% Quantity%	16 10.13	28 17.72	57 36.08	39 24.68	18 11.39	158
Q 1.6n I find there are a lot of inconsistencies on *myUnisa*	Quantity% Quantity%	17 11.56	61 41.50	47 31.97	22 14.97	0 0.00	147
Q 1.7 I think most people would learn to use *myUnisa* quickly	Quantity% Quantity%	8 5.06	20 12.66	46 29.11	59 37.34	25 15.82	158
Q 1.8n I find *myUnisa* very cumbersome to use	Quantity% Quantity%	21 14.38	37 25.34	52 35.62	36 24.66	0 0.00	146
Q 1.9 I feel confident when I am using *myUnisa*	Quantity% Quantity%	0 0.00	10 6.33	33 20.89	64 40.51	51 32.28	158
Q 1.10n It was a steep learning curve before I could use *myUnisa*	Quantity% Quantity%	30 20.13	49 32.89	38 25.50	32 21.48	0 0.00	149

Factor S1: Pragmatic quality: The usability of the system							
Question		Not at all	Rarely	Some-times	Often	Always	Total
Q 2.1 I find the *myUnisa* features suitable to facilitate online learning	Quantity%	7 4.43	18 11.39	46 29.11	67 42.41	20 12.66	158
Q 2.2 I can independently facilitate online learning via *myUnisa*	Quantity%	9 5.70	13 8.23	51 32.28	57 36.08	28 17.72	158
Q 2.6 I am skilled in the *myUnisa* tools that support online learning	Quantity%	2 1.29	15 9.68	40 25.81	68 43.87	30 19.35	155
Q 2.7 I have the knowledge to choose the correct instructional methodologies	Quantity%	5 3.25	18 11.69	49 31.82	62 40.26	20 12.99	154
Q 2.12 I am positive that *myUnisa* is a suitable tool to facilitate on-line or blended learning	Quantity%	10 6.33	19 12.03	50 31.65	59 37.34	20 12.66	158
Q 2.14 *myUnisa* has to be functionally adequate for me, as lecturer, to accomplish the necessary on-line learning facilitation tasks	Quantity%	3 1.90	8 5.06	32 20.25	56 35.44	59 37.34	158
Q 2.16 I have enough practical experience with the technology to use *myUnisa* effectively	Quantity%	0 0.00	10 6.33	25 15.82	64 40.51	59 37.34	158
Q 2.18 I experience *myUnisa* as an efficient tool to use for facilitation of online learning	Quantity%	10 6.33	22 13.92	51 32.28	57 36.08	18 11.39	158
Q 2.19 *myUnisa* is flexible and I can easily change things	Quantity%	25 15.82	30 18.99	54 34.18	36 22.78	13 8.23	158
Q 2.20 If I make a mistake while using *myUnisa*, it is easy to retrace my steps and rectify the error	Quantity%	16 10.13	32 20.25	45 28.48	48 30.38	17 10.76	158
Q 2.21 *myUnisa* is constantly available	Quantity%	51 32.28	37 23.42	38 24.05	25 15.82	7 4.43	158
Q 2.22 I don't lose information while I use *myUnisa*	Quantity%	21 13.29	41 25.95	40 25.32	39 24.68	17 10.76	158
Q 2.23 The response time of *myUnisa* is swift	Quantity%	21 13.29	39 24.68	50 31.65	41 25.95	7 4.43	158
Q 2.24 *myUnisa* is an appropriate system to use for facilitation of online learning in an ODL institution	Quantity%	11 6.96	16 10.13	60 37.97	54 34.18	17 10.76	158
Total		332	604	1099	1211	497	3743
	Frequency Missing = 7 Chi-square = 871.28 *** The probability that the Chi-square statistic assumes the value of 871.28 under the null hypothesis that frequency response patterns for the different questions do not differ statistically significantly is <0.0001. Therefore highly significant on the 0,1% level of significance (***)						

5.3.4.2 System - The pedagogical appropriateness of the system

In Table 5.10 it is demonstrated that the majority of rating responses to the 6 questions that explored if the pedagogical appropriateness of the system influences the UX when facilitating online learning, fell towards the '4' and '5' rating scores (in total 449 of 948, or 47% of the participants). Therefore, since the '4' and '5' rating values indicate 'strongly agree' and 'agree' perceptions, this shows that those academic lecturers indicated that they thought that pedagogical appropriateness of the system influences facilitation of online learning. This implies that the pedagogical

appropriateness of the system has an impact on UX. This interpretation is based on a comparison with the total '1' and '2' rating responses recorded in this table, namely 178 responses in total, or 18.7% of the participants. Consequently, more participants indicated that they agreed that the pedagogical appropriateness of the system have an influence when facilitating online learning than those who indicated disagreement.

Table 5.10: How the pedagogical appropriateness could influence UX

Factor S2: The pedagogical appropriateness of the system							
Question		Not at all	Rarely	Sometimes	Often	Always	Total
Q 2.1 I find the *myUnisa* features suitable to facilitate online learning	Quantity	7	18	46	67	20	158
Q 2.9 I have aligned my conventional teaching methods to methods suitable for the facilitation of online learning	Quantity	2	20	49	64	23	158
Q 2.12 I am positive that *myUnisa* is a suitable tool to facilitate on-line or blended learning	Quantity	10	19	50	59	20	158
Q 2.18 I experience *myUnisa* as an efficient tool to use for facilitation of online learning	Quantity	10	22	51	57	18	158
Q 2.24 *myUnisa* is an appropriate system to use for facilitation of online learning in an ODL institution.	Quantity	11	16	60	54	17	158
Q 2.35 I experience *myUnisa* in a positive light because access to media tools (e.g. graphics, OER, sound, podcasts, etc.) to facilitate online learning is readily available	Quantity	15	28	65	38	12	158
Total		55	123	321	339	110	948
	Chi-square = 32.66*						

5.3.4.3 System - Hedonic quality: Pleasure and attractiveness

Table 5.11 indicates that the majority of rating responses to the 10 questions that investigated if the academic lecturers perceive that the hedonic quality of the system influences the UX when facilitating online learning, fell towards the '4' and '5' rating scores (in total 573 of 1 575, or 36% of the participants). In other words, since the '4' and '5' rating values indicate 'strongly agree' and 'agree' perceptions, this shows that academic lecturers indicated that they thought that pleasure when using the system and attractiveness of the system influence facilitating online learning. This interpretation is based on a comparison with the total '1' and '2' rating responses recorded in this table, namely 298 responses in total or 18.9% of the participants. Thus, more participants indicated that they agreed that the hedonic quality of the system has an influence when facilitating online learning than those who indicated disagreement.

Table 5.11: How the hedonic quality could influence UX

Factor S3: Hedonic quality: Pleasure and attractiveness							
Question		Not at all	Rarely	Some-times	Often	Always	Total
Q 1.1 I enjoy using *myUnisa* on a regular basis	Quantity%	5 3.16	8 5.06	56 35.44	56 35.44	33 20.89	158
Q 2.3.1 1 I feel connected to students who follow online courses while I facilitate learning using *myUnisa*	Quantity%	10 6.37	25 15.92	55 35.03	47 29.94	20 12.74	157
Q 2.3.2 I feel connected to my colleagues when I facilitate learning using *myUnisa*	Quantity%	35 22.29	41 26.11	50 31.85	26 16.56	5 3.18	157
Q 2.4 I find pleasure in mastering the intricacies of *myUnisa*	Quantity%	13 8.39	23 14.84	44 28.39	53 34.19	22 14.19	155
Q 2.5 I feel that *myUnisa* enables me to be creative and innovative when I facilitate online learning	Quantity%	17 10.76	25 15.82	49 31.01	48 30.38	19 12.03	158
Q 2.17 I enjoy using *myUnisa* even if I am not in a good mood	Quantity%	9 5.70	19 12.03	60 37.97	50 31.65	20 12.66	158
Q 2.25 It is an enjoyable and fun experience to work on *myUnisa*	Quantity%	10 6.33	29 18.35	60 37.97	48 30.38	11 6.96	158
Q 2.26 The *myUnisa* user interface is visually attractive	Quantity%	24 15.19	22 13.92	67 42.41	38 24.05	7 4.43	158
Q 2.30 I feel negative about the consistent interaction needed between me, the students and/or tutors in an ODL environment (via *myUnisa*)	Quantity%	41 25.95	59 37.34	38 24.05	17 10.76	3 1.90	158
Q 2.35 I experience *myUnisa* in a positive light because access to media tools	Quantity%	15 9.49	28 17.72	65 41.14	38 24.05	12 7.59	158
Total		179	279	544	421	152	1575
	Frequency Missing = 5 Chi-square = 228.88***						

5.3.5 Context of Use

The quantitative analyses and results for the context of use concepts are discussed in the following sections. Section 5.3.5.1 presents the analysis of the organisation in the ODL context, section 5.3.5.2 shows the analysis of the institutional administrative and structural procedures' effect on the UX and section 5.3.5.3 reveals the analysis of the effect that the technical support has on the UX of the academic lecturer when using an LMS.

5.3.5.1 **Context - Organisational: The ODL context**

Table 5.12 shows that the majority of rating responses to the 16 questions that explored if the university as an ODL institution influences the UX when facilitating online learning, fell towards the '4' and '5' rating scores (in total 1 066 of 2 524, or 42% of the participants). Therefore, since the '4'

and '5' rating values indicate 'strongly agree' and 'agree' perceptions, this shows that those academic lecturers indicated that they thought that the contextual aspects of the ODL institution do influence the facilitation of online learning. This implies that the university as an ODL institution has an impact on UX. This interpretation is based on a comparison with the total '1' and '2' rating responses recorded in this table, that is 658 responses in total, or 26% of the participants. Consequently, more participants indicated that they agreed that the ODL institution as the context where the LMS is used has an influence when facilitating online learning than those who indicated disagreement.

Table 5.12: How the Organisational context could influence the UX

Factor C1: Organisational: The ODL context							
Question		Not at all	Rarely	Some-times	Often	Always	Total
Q 2.8 I need professional development interventions (i.e. workshops offered by the CPD) to enhance my online-facilitation skills	Quantity% 	22 14.29	35 22.73	38 24.68	37 24.03	22 14.29	154
Q 2.9 I have aligned my conventional teaching methods to methods suitable for the facilitation of online learning	Quantity% 	2 1.27	20 12.66	49 31.01	64 40.51	23 14.56	158
Q 2.10 I have the skills to follow ODL strategies when using *myUnisa*	Quantity% 	6 3.80	14 8.86	47 29.75	66 41.77	25 15.82	158
Q 2.11 I have the skills to use available media and technologies for enhancement of facilitation of my online teaching	Quantity% 	2 1.27	19 12.03	42 26.58	71 44.94	24 15.19	158
Q 2.12 I am positive that *myUnisa* is a suitable tool to facilitate on-line or blended learning	Quantity% 	10 6.33	19 12.03	50 31.65	59 37.34	20 12.66	158
Q 2.13 I am informed on the affordances of *myUnisa* for the facilitation of on-line or blended learning	Quantity% 	9 5.70	23 14.56	66 41.77	49 31.01	11 6.96	158
Q 2.14 *myUnisa* has to be functionally adequate for me, as lecturer, to accomplish the necessary on-line learning facilitation tasks	Quantity% 	3 1.90	8 5.06	32 20.25	56 35.44	59 37.34	158
Q 2.18 I experience *myUnisa* as an efficient tool to use for facilitation of online learning	Quantity% 	10 6.33	22 13.92	51 32.28	57 36.08	18 11.39	158
Q 2.24 *myUnisa* is an appropriate system to use for facilitation of online learning in an ODL institution	Quantity% 	11 6.96	16 10.13	60 37.97	54 34.18	17 10.76	158
Q 2.27 I have a negative perception of *myUnisa* because it introduced the compulsory production of multiple modes of knowledge delivery i.e. print based, as well as online distribution of teaching material	Quantity% 	41 25.95	53 33.54	48 30.38	11 6.96	5 3.16	158
Q 2.28 I do not have enough time for the effective facilitation of on-line learning because of the required production of multiple modes of knowledge delivery i.e. print based, as well as online distribution of teaching material	Quantity% 	16 10.13	28 17.72	53 33.54	33 20.89	28 17.72	158
Q 2.29 I have a negative perception of *myUnisa* due to inflexible teaching schedules imposed by Unisa calendars	Quantity% 	21 13.29	46 29.11	49 31.01	27 17.09	15 9.49	158

Factor C1: Organisational: The ODL context							
Question		Not at all	Rarely	Some-times	Often	Always	Total
Q 2.30 I feel negative about the consistent interaction needed between me, the students and/or tutors in an ODL environment (via *myUnisa*)	Quantity% 	41 25.95	59 37.34	38 24.05	17 10.76	3 1.90	158
Q 2.32 I feel positive towards *myUnisa* because of good quality training and support in online activities and interaction tools available to academics	Quantity% 	5 3.16	29 18.35	64 40.51	52 32.91	8 5.06	158
Q 2.33 I feel positive towards *myUnisa* because training and support in online activities and interaction tools are available to academics when needed	Quantity% 	5 3.16	32 20.25	54 34.18	58 36.71	9 5.70	158
Q 2.34 My experience of the development opportunities for academics to use *myUnisa* is positive	Quantity% 	9 5.70	22 13.92	59 37.34	51 32.28	17 10.76	158
Total		213	445	800	762	304	2524
	Frequency Missing = 4 Chi-square = 538.75***						

5.3.5.2 Context - Institutional administrative and structural procedures

According to Table 5.13 the results for whether the academic lecturers perceived that the institutional administrative and structural procedures influence the UX when facilitating online learning are somewhat different from the preceding results. Table 5.13 indicates that the majority of rating responses to the 5 questions that investigated if the academic lecturers perceived that the institutional administrative and structural procedures influence the UX when facilitating online learning, fell towards the '1' and '2' rating scores (in total 284 of 790 or 35.9% of the participants). In other words, since the '1' and '2' rating values indicate 'Not at all' and 'Rarely' opinions, this shows that academic lecturers indicated that they did not think that institutional administrative and structural procedures influence facilitating online learning. In comparison, the total '4' and '5' rating responses presented in this table, namely that 249 responses out of 790 or 31.5% (difference of 4%) of the participants. Thus, slightly more participants indicated that they did not agree that the institutional administrative and structural procedures have an influence when facilitating online learning, than those who indicated that the institutional administrative and structural procedures do have an influence on their experience when facilitating online learning.

Table 5.13: How the Institutional and Administrative procedures could influence the UX

Factor C2: Institutional administrative and structural procedures							
Question		Not at all	Rarely	Some-times	Often	Always	Total
Q 2.27 I have a negative perception of *myUnisa* because it introduced the compulsory production of multiple modes of knowledge delivery i.e. print based, as well as online distribution of teaching material	Quantity% 	41 25.95	53 33.54	48 30.38	11 6.96	5 3.16	158
Q 2.28 I do not have enough time for the effective facilitation of on-line learning because of the required production of multiple modes of knowledge delivery i.e. print based, as well as online distribution of teaching material	Quantity% 	16 10.13	28 17.72	53 33.54	33 20.89	28 17.72	158
Q 2.29 I have a negative perception of *myUnisa* due to inflexible teaching schedules imposed by Unisa calendars	Quantity% 	15 9.49	27 17.09	49 31.01	46 29.11	21 13.29	158
Q 2.31 My experience with *myUnisa* is negative for the reason of time constraints due to administrative schedules and tasks	Quantity% 	23 14.56	38 24.05	42 26.58	32 20.25	23 14.56	158
Q 2.35 I experience *myUnisa* in a positive light because access to media tools (e.g. graphics, OER, sound, podcasts, etc.) required to facilitate online learning is readily available	Quantity% 	15 9.49	28 17.72	65 41.14	38 24.05	12 7.59	158
Total		110	174	257	160	89	790
Chi-square = 82.56***							

5.3.5.3 **Context - Technical: Available technologies and technical support**

Table 5.14 shows that the majority of rating responses to the 10 questions that explored if the available technologies and technical support influence the UX when facilitating online learning, fell towards the '4' and '5' rating scores (in total 691 of 1 576 or 43.8% of the participants). Therefore, since the '4' and '5' rating values indicate 'strongly agree' and 'agree' perceptions, this shows those academic lecturers indicated that they thought that the available technologies and technical support influence the facilitation online learning. This implies that available technologies and technical support have an impact on UX. This interpretation is based on a comparison with the total '1' and '2' rating responses recorded in this table, namely that 419 responses in total or 26.5%. Consequently, more participants indicated that they agreed that the available technologies and technical support have an influence when facilitating online learning than those who indicated disagreement that the available technologies and technical support do not influence their experience when facilitating online learning.

Table 5.14: How the Technical context and support could influence UX

Factor C3: Technical: Available technologies and technical support							
Question		Not at all	Rarely	Some-times	Often	Always	Total
Q 1.4 I need the support of a technical person to be able to use *myUnisa*	Quantity%	12 7.79	29 18.83	40 25.97	73 47.40	0 0.00	154
Q 2.1 I find the *myUnisa* features suitable to facilitate online learning	Quantity%	7 4.43	18 11.39	46 29.11	67 42.41	20 12.66	158
Q 2.11 I have the skills to use available media and technologies for enhancement of facilitation of my online teaching	Quantity%	2 1.27	19 12.03	42 26.58	71 44.94	24 15.19	158
Q 2.13 I am informed on the affordances of *myUnisa* for the facilitation of on-line or blended learning	Quantity%	9 5.70	23 14.56	66 41.77	49 31.01	11 6.96	158
Q 2.16 I have enough practical experience with the technology to use *myUnisa* effectively	Quantity%	0 0.00	10 6.33	25 15.82	64 40.51	59 37.34	158
Q 2.21 *myUnisa* is constantly available	Quantity%	51 32.28	37 23.42	38 24.05	25 15.82	7 4.43	158
Q 2.22 I don't lose information while I use *myUnisa*	Quantity%	21 13.29	41 25.95	40 25.32	39 24.68	17 10.76	158
Q 2.23 The response time of *myUnisa* is swift	Quantity%	21 13.29	39 24.68	50 31.65	41 25.95	7 4.43	158
Q 2.33 I feel positive towards *myUnisa* because training and support in online activities and interaction tools are available to academics when needed	Quantity%	5 3.16	32 20.25	54 34.18	58 36.71	9 5.70	158
Q 2.35 I experience *myUnisa* in a positive light because access to media tools (e.g. graphics, OER, sound, podcasts, etc.) required to facilitate online learning is readily available	Quantity%	15 9.49	28 17.72	65 41.14	38 24.05	12 7.59	158
Total		143	276	466	525	166	1576
	Chi-square = 393.88***						

5.3.6 Scale Reliability Testing

This section reports on the scale reliability tests that were performed to test the internal consistency reliability of the nine UX factors identified in the literature. It verifies the internal consistency reliability of the nine subsets of responses that probed perceptions of the impact of these factors on UX. Table 5.15 reports that the Cronbach alpha coefficients all exceed the value of 0.7. In other words, the responses to these subsets of questions can be used to calculate nine perception measures that indicate how participants perceive the factors to impact UX. The tests indicate that reliable measures of perceptions were calculated.

Each row of the table presents the results of a scale reliability test. The tests were conducted on the rating responses of participants recorded for the subsets of questionnaire items indicated for each test in the second column of Table 5.15.

Table 5.15: The Scale Reliability Test: The internal consistency reliability test of the nine UX factors identified in the literature

Factors as derived from the literature	Items included	Items reversed/ removed	Cronbach alpha	Mean perception score	Standard deviation of *p.score*
USER Component - as derived from the literature and defined for the study					
User Needs (U1)	Q1.9; Q2.2 – Q2.9; Q2.14; Q2.15		0.76	3.48	0.58
User Skills (U2)	Q2.2; Q2.6; Q2.7; Q2.9-Q2.11; Q2.13; Q2.15; Q2.16		0.86	3.67	0.67
User Characteristics (U3)	Q2.12; Q2.15; Q2.17; Q2.25; Q2.32- Q2.35;		0.82	3.22	0.73
User Characteristics (U3)	Q2.12; ~~Q2.15;~~ Q2.17; Q2.25; Q2.32- Q2.35;	Q2.15 removed	0.86		
SYSTEM Component - as derived from the literature and defined for the study					
Pragmatic - Usability (S1)	Q1.1; Q1.2n; Q1.3; Q1.4n; Q1.5; Q1.6n; Q1.7; Q1.8n; Q1.9; Q1.10n; Q2.1; Q2.2; Q2.6; Q2.7; Q2.12; Q2.14; Q2.16; Q2.18 - Q2.25	Q1.2n; Q1.4n; Q1.6n; Q1.8n; Q1.10n reversed	0.90	3.38	0.63
Appropriate (S2)	Q2.2; Q2.9; Q2.12; Q2.18; Q2.24; Q2.35;		0.85	3.30	0.86
Appropriate (S2)	Q2.2; ~~Q2.9;~~ Q2.12; Q2.18; Q2.24; Q2.35;	Q2.9 removed	0.89		
Hedonic - Pleasure (S3)	Q1.1; Q2.3.1; Q2.3.2; Q2.4; Q2.5; Q2.17; Q2.25; Q2.26; Q2.30n; Q2.35;		0.82	3.15	0.75
Hedonic - Pleasure (S3)	Q1.1; Q2.3.1; Q2.3.2; Q2.4; Q2.5; Q2.17; Q2.25; Q2.26; ~~Q2.30n~~; Q2.35;	Q2.30n removed	0.87		
CONTEXT OF USE Component - as derived from the literature and defined for the study					
ODL Organisation (C1)	Q2.8n; Q2.9 - Q2.14; Q2.18; Q2.24; Q2.27n - Q2.30n; Q2.32- Q2.34;	Q2.8n, Q2.27n - Q2.30n reversed	0.83	3.39	0.63
Admin and Structure (C2)	Q2.27n; Q2.28n; Q2.29n; Q2.31n; Q2.35;	Q2.27n- Q2.29n, Q2.31n reversed	0.74	3.03	1.05
Technical (C3)	Q 1.4; Q 2.1; Q 2.11; Q 2.13; Q 2.16; Q2.21- Q 2.23; Q 2.33; Q 2.35		0.69	3.19	0.59
Technical (C3)	~~Q 1.4;~~ Q 2.1; Q 2.11; Q 2.13; Q 2.16; Q2.21- Q 2.23; Q 2.33; Q 2.35	Q 1.4 removed	0.73		
Cronbach alpha values in the order of 0.7 or greater than 0.7 are regarded as indicator of internal consistency reliability.					

The scale reliability test revealed that some of the items differentiated too much in the groups of some of the categories. These items were removed from the group. Some of the items were posed as negative questions and the answers were thus reversed (see third column).

5.3.7 Calculation of Perception Measures for the nine UX factors

Table 5.16 presents the overall calculation of perception measures for the nine UX factors (derived from the literature and defined for this study) to enable this research to evaluate how respondents and respondent-groups perceive the nine factors.

Table 5.16: Calculation of perception measures for the nine UX factors

Variable	Factor	N	Mean	Standard Dev	Min	Max
U1	The needs of academics	158	3.48	0.58	2.00	5.00
U2	The skills of the academics	158	3.67	0.67	1.67	5.00
U3	Mood, attitude of the academics	158	3.22	0.73	1.43	5.00
S1	Pragmatic quality: usability of the system	158	3.38	0.63	1.95	5.00
S2	Pedagogical appropriateness of the system	158	3.30	0.86	1.00	5.00
S3	Hedonic quality: Attractiveness of the system	158	3.15	0.75	1.11	4.89
C1	ODL context; Development opportunities	158	3.39	0.63	1.83	5.00
C2	Administrative & structural procedures	158	3.03	1.05	1.00	5.00
C3	Available technologies and technical support	158	3.19	0.59	1.89	4.89

This section reports on the perception measures calculated. For example, for each participant, his or her perception of the impact of skills on UX (U2) was calculated as the average rating that he or she marked to questions Q2.2; Q2.6; Q2.7; Q2.9-Q2.11; Q2.13; Q2.15 and Q2.16.

The second table of this section (Table 5.7), for example indicates that participants in general agreed that skills affect UX. This statement can be made because the mean value (or average) for the factor U2, the perception mean, is reported as 3.67. If rounded off to the nearest integer, this will be 4. A rating score of '4' indicates agreement. Therefore, the mean value indicates that participants in general perceived that skills affect UX.

The other means of this table are interpreted likewise.

5.3.8 Discussion of the Quantitative Analysis

The responses provided evidence that nearly all of the nine identified factors do have an influence on UX when using an LMS to facilitate online learning. However, the responses to the factor `Context - Institutional administrative and structural procedures`, show that slightly more participants (35.9%

in contrast to 31.5% of the participants), indicated that the institutional administrative and structural procedures do not have an influence on the UX.

In Table 5.17 the contents of the preceding tables (Table 5.6 – Table 5.14) as described above, are summarised according to the perception of the participants and their UX.

Table 5.17: Summary of the tables from the quantitative analysis

Factors that could influence the UX when using an LMS	**No of questions**	**Not at all**	**Rarely**	**Some-times**	**Often**	**Always**	**Total**	**Agree**	**Not agree**	**Chi-square**
The academic has certain *needs* when facilitating courses in an online environment	11	117	222	456	563	364	1 722	54%	19.6%	395.70 ***
The *skills* of the academic could influence the UX when using the LMS	9	36	141	384	546	308	1 415	60%	12.5%	220.41 ***
The academic's mood, perspective, attitudes, etc. could influence the UX	8	64	187	427	401	185	1 264	46%	19.8%	288.95 ***
Pragmatic quality: The (technical) usability of the system (LMS)	24	332	604	1099	1211	497	3 743	45.6%	25%	871.28 ***
The pedagogical *appropriateness* of the system (LMS)	6	55	123	321	339	110	948	47%	18.7%	32.66*
Hedonic quality: Pleasure and attractiveness	10	179	279	544	421	152	1 575	36%	18.9%	228.88 ***
Organisational: The ODL context strategies; Development/training support	16	213	445	800	762	304	2 524	42%	26%	538.75 ***
Institutional administrative and structural procedures	5	110	174	257	160	89	790	31.5%	35.9%	82.56**
Available technologies to be used with the LMS e.g. multimedia and collaborative toolsets in a distributed web-based environment, OER. Technical support to use these technologies.	10	143	276	466	525	166	1 576	43.8%	26.5%	393.88 ***

The following section presents the qualitative analysis in order to expand and enlighten the quantitative data.

5.4 Qualitative Analysis

This qualitative analysis explored the phenomenon of UX and the factors that influence the UX when using LMS in an ODL institution. As stated in section 4.3.1 in Chapter 4 (Research design and methodology), a convergent parallel design has been applied in this research. This design proposes that the quantitative and qualitative strands should be implemented during the same phase of the

research process. The quantitative and qualitative data were concurrently collected, but the strands were kept separate and independent during the analysis. The collection of the qualitative data was conducted by means of the same instrument, that is the same questionnaire which has been used for the quantitative data collection, but the qualitative data were extracted from the responses from the open ended question, while the quantitative data were extracted from the responses to the questions with 5 point Likert scale ratings. The results of this were only mixed during the overall interpretation at the end of the study (Table 5.18). The convergent parallel design was used in this research in order to augment the data from the same source of collection, during the same phase.

Seventy two participants gave feedback on the open ended question. Feedback was anonymous, so it seems if the participants were not afraid to expose their opinions. The narrative feedback was combined into one document, which was then used as primary document in Atlas.ti ® for coding purposes.

As stated in section 4.3.2 the provisional coding method has been applied (Saldaña, 2009) where a preliminary list of codes was used as the main categories. These categories mainly constituted the components as set out in the analytic framework, (see section 5.2) namely the user, systems and context.

The information obtained in deliberating the open ended question is discussed in sections 5.4.1 to 5.4.3. For the purposes of context and readability, direct quotations from the responses, as well as a summary of the responses are given in this section.

5.4.1 User

In order to understand the user, the user's needs have to be identified in the real context where the system is used (Roto, 2006). Research has indicated that feelings of autonomy, competence and high self-esteem seemed to correlate with the most satisfying experiences (see section 2.3.1.1).

Figure 5.5 is a presentation of the User category (codes U1, U2 and U3) by way of the *network view* from Atlas.ti (Version 6.1) Family code manager. The meaning of the description, for example {1-0}: The first number shows the frequency (how often the code has been applied). The second number the density (how many other codes this code is linked to).

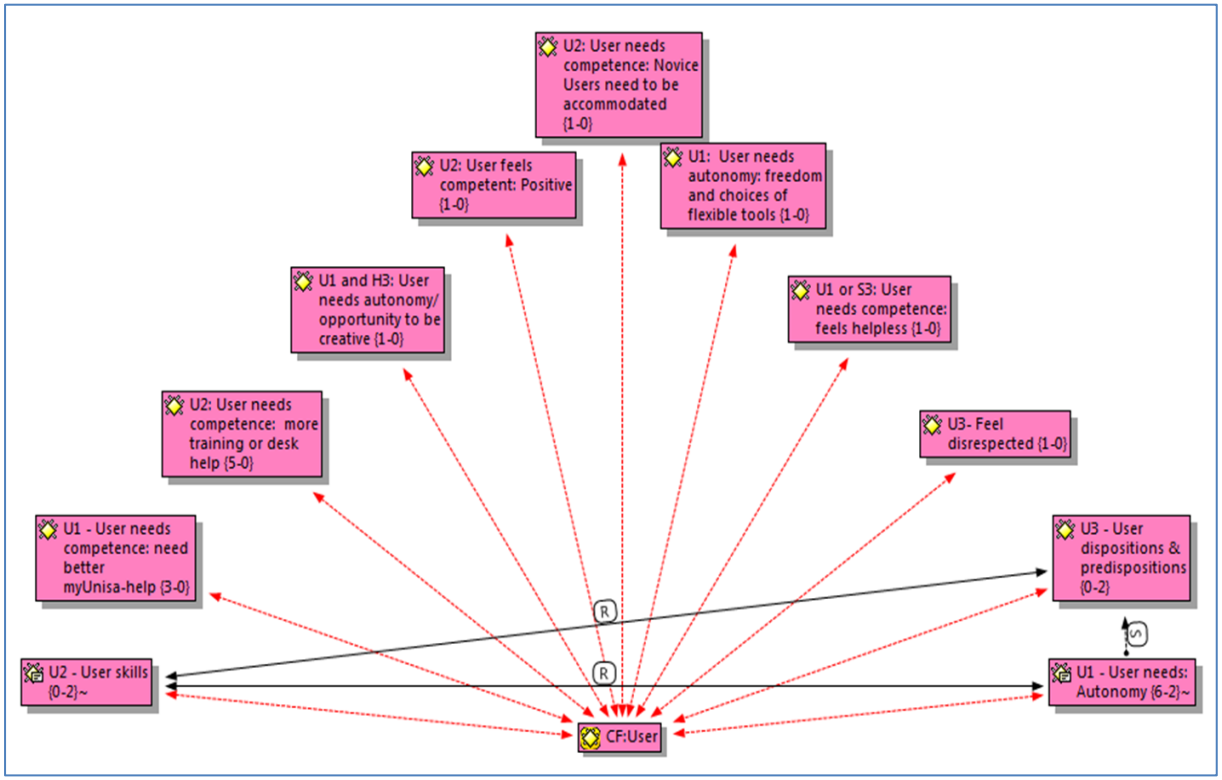


Figure 5.5: Codes applicable to the User category

As can be observed from the network view, according to the feedback from the participants, most comments were regarding user needs and user skills. The researcher's interpretation of the participants' responses is as follows:

- Several participants implied that they **need to feel competent** (code U1) when they use the LMS and hence suggested as follows that they need more help in order to improve the utilization of the LMS:
    - "I don't know where to find some of the tools mentioned in the first section of the questionnaire … myUnisa training is often theory, presented with a power point presentation instead of hands-on training. It will be helpful if each Department (or College) can have a designated person to assist staff with problems in their offices."
    - "I would prefer that one person be readily available or even housed in the department to enable me to trouble shoot -at the moment there is no support for me at that level and it's frustrating -yet I love the blended mode."
    - "I would make much more effective use of myUnisa if I knew how to use some of the more technological tools. I am not always sure how to use some of the advanced features despite attending various training courses".

These opinions indicated that the academic lecturers need a kind of support on demand, just in time, rather than training in prescheduled groups. It also disclosed that there is still a need for improvement of knowledge and skills so that they can be more competent to use the LMS.

- Some participants pointed out that the **need of autonomy** (code U1) was necessary to use the LMS creatively and effectively:
    - "I do not like the fact, that the administrators control linking aspects. It is never done proactively - every year I have begged an administrator to link me for the following year. Why cannot we do it ourselves and the administrator could check and authorize it."
    - "Thus, I look forward to the day that we, as academics, are given the autonomy to run our own module sites".
    - "… the restrictions placed on the use of myUnisa (for example contacting ICT to remove the Discussion Forums tool and replace it with the Discussions tool) is hampering my autonomy to customise and create an exciting virtual learning environment for students".
    - "The option for an external assessment exists on myUnisa, BUT I CAN'T CHOOSE IT!! Please, allow the academics flexibility to use all of myUnisa's functions and options".
    - "I feel that I would benefit from being given more 'rights' to use myUnisa to its full potential. I can understand that ICT may have been reluctant to open up access to the full range of functions in the past and this approach may be very daunting to novices, but Unisa has had myUnisa for several years and academics should, at the very least, be familiar with its functions and options by now".

These comments indicated that the confident user may need more autonomy in order to use the LMS effectively.

- The **skills** of the academic lecturer (code U2) could influence the UX when using the LMS as supported by the following examples:
    - "More lessons on how to use myUnisa effectively is required, especially to us the less computer literate."
    - "On the whole myUnisa is a fantastic virtual learning environment. I am now at the stage where I am proficient in the development of study material for online delivery and the use of myUnisa."
    - "I would make much more effective use of myUnisa if I knew how to use some of the more technological tools. I am not always sure how to use some of the advanced

features despite attending various training courses. I find myUnisa an excellent tool for learning but I wish I could do more to integrate it with assessment."

- The academic's **dispositions** – such as **perspectives** and **attitudes** (code U3) could influence the UX as noticeable in the following examples:
    - "My negative perception of the myUnisa system undoubtedly comes from the highly unprofessional way in which it was developed over the last few years -- using both students and instructors to effectively debug what was originally very bad software -- as well as a severe lack of time for academic activities at Unisa, due to many unnecessary administrative duties that I have to perform. Granted, myUnisa has improved somewhat over the years, but I will always regret the way in which it was repeatedly, prematurely implemented. It was a great insult to both the Unisa student body and teaching staff -- one of many!"
    - "myUnisa is ugly and inflexible. It exudes a bureaucratic ethos. I do things on it because I have to, not because it inspires me in any way."

According to these responses all three the proposed factors regarding the user, play a role in the UX of the academic lecturer when using the LMS.

5.4.2 Discussion of Qualitative Analysis for the User

As explained in the literature review (see section 2.3.1) the user can be described as having the characteristics of needs, motivations, experiences, expectations, predispositions, mental state and resources (Roto, 2006; Roto et al. 2010). The open ended question aimed to identify what the user's needs and perceptions were in the real context where the system is used as described by Roto (2006).

It became evident from the feedback that participants felt frustrated and helpless regarding the limitations of the LMS. The most vocalised needs were to have control to change and implement the tools of choice. Apparently it seems if the ICT services control the tools. The participants disclosed in their feedback that they needed to feel competent and indicated that they needed autonomy when they use the LMS. This seems to correlate with the findings of Hassenzahl (2008) previously referred to (see section 2.3.1.1), which indicated that a feeling of competence was the most significant psychological need of the user, followed by a need for autonomy. This was backed by Partala and Kallinen (2012) who also found that feelings of autonomy, competence and high self-esteem seemed to correlate with the most satisfying experiences. According to literature (Lowgren & Stolterman, 2004) users could have a need for personal connectedness i.e. to stay in touch with others in a

meaningful way. The participants indicated that they would welcome more participation and use of the LMS facilities by the students.

In order to integrate the use of technology in their teaching, academic lecturers need to understand the complex interaction among three bodies of knowledge, namely *content* (subject matter), *pedagogy* (instruction and understanding how the student thinks and learns) and *technology* (Mishra & Koehler, 2006). Academic lecturing staff members usually have to receive training and support to enhance their technology skills in order to facilitate online courses (see section 2.3.1.2). Coherent with the literature, the participants indicated that their skills have an influence on how and to what extent they are able to use the LMS.

Positive or negative feelings have a considerable impact on how users interact with technology (Khalid, 2006). When the academic lecturer struggles with technology it could cause feelings of frustration, despair of excitement (see section 2.3.1.3) as confirmed by the feedback received from participants. According to this feedback the frustration and lack of motivation do have a negative influence on the UX when using the LMS.

5.4.3 System

Important aspects that could influence the UX when using an LMS are the functionality, aesthetics, responsiveness, usefulness and ease of use (Roto et al. 2010). The qualities and reliability of these features would encourage or discourage the user to utilise the system (see section 2.3.2). Figure 5.6 is a presentation of the System category (codes S1, S2 and S3) by way of the network view from Atlas.ti (Version 6.1) Family code manager. With this view it can be observed that the factors of pragmatic quality and pedagogical appropriateness of the system play an important role in the UX of academic lecturers when using the LMS.

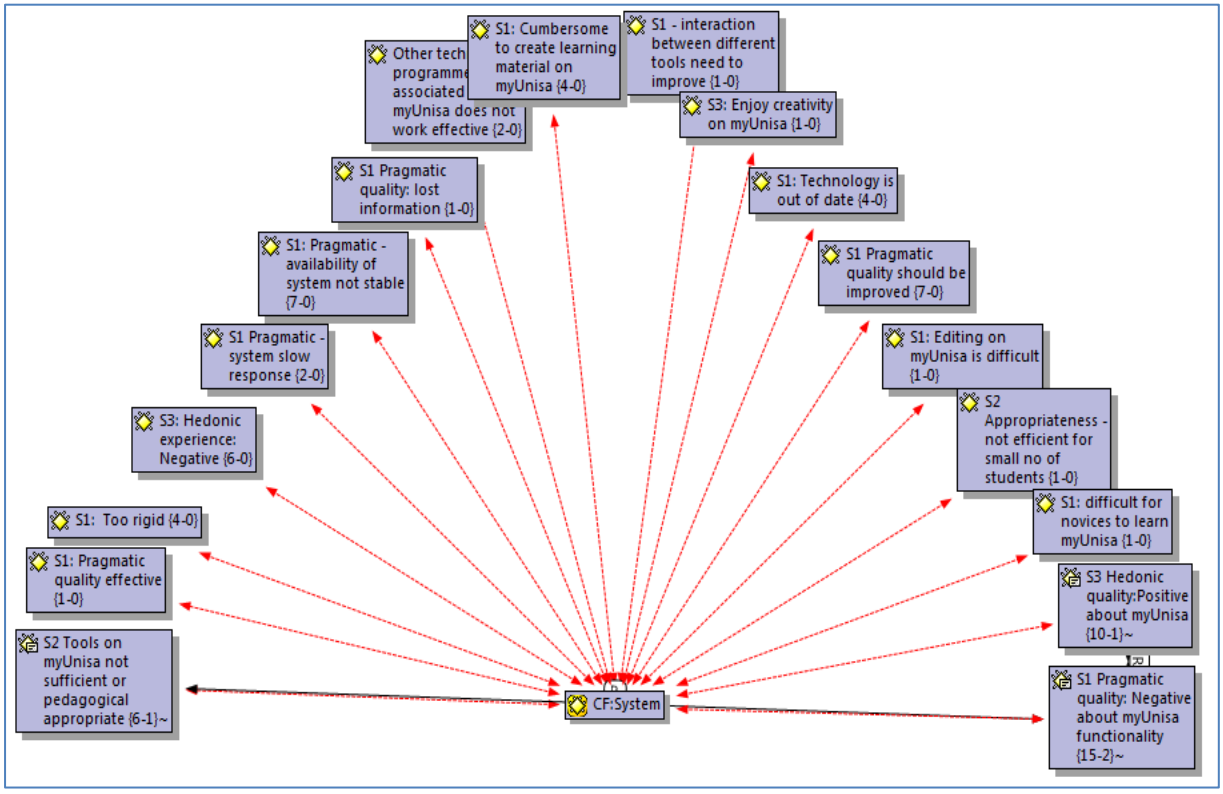


Figure 5.6: Codes applicable to the System category

The feedback from the participants exposed that several of the academic lecturers' impressions were that the functionality of the system plays a role in the utilisation of the LMS. The researcher's interpretation of the participants' responses in this regard is as follows:

- There is an indication that **pragmatic quality** (code S1) has an influence on the UX of the academic lecturer. According to the following responses the system is not easy to use:
  - "Regarding styling of an online guide, for instance, the tools for manipulating appearance are very cumbersome and don't offer the ability to make universal changes--every element has to be styled individually, which is very inefficient."
  - "MyUnisa is rated as second generation mode of technology, which is slow and lacks interactivity."
  - "Version control is a big problem and formatting issues."
  - The following comment refers to a few problems in this regard: "It is an adequate system, perhaps not utilised to its full potential by myself or by other academics, but it does have negatives, namely down times, tardiness, duplication of information, not as user friendly as it could be etc."
  - A comment of "HEEEEELLLLLLLLPPPP:)" says everything – the system needs to be more user friendly.

- The following phrases from participants concern the **pedagogical appropriateness** (code S2) and that *myUnisa* lacks flexibility and interactivity regarding the specific course requirements:
    - "My module uses true online delivery such as interactive formative assessment platforms, computer-game type practical assignments etc., and these cannot be incorporated into myUnisa. There is no flexibility."
    - "The available tools on myUnisa are prescribed to the academics by the ICT department and are not informed by academic and/or pedagogical requirements."
    - There was also an indication that the target group of the course is not being accommodated - "The system is rather rigid. It does not really allow for flexibility or ease of use. I have noticed this especially among my older colleagues. They struggle to upload images due to the unnecessarily complex nature of this task."
    - It has been commented that it is difficult to transform tutorial letters to be acceptable in an online format - "Web-based styling is very different from hard copy styling, so the uploading of a 101 Tutorial Letter by simply dropping it into the editor results in a stylistically inappropriate and effectively unusable output".
- Feedback that showed pleasure, joy or on the other hand, lack of joy, was considered as concerning the **hedonic qualities** (code S3) of the LMS and included the following:
    - Some participants expressed positive feelings when using the LMS –
        - "I love implementing my creative skills on MyUnisa although I would appreciate more participation from the students."
        - "I enjoy working on myUnisa , I don't think that myUnisa as a tool is bad."
        - "I enjoy using myUnisa, but hate it when it is offline or sometimes extremely slow."
        - "I enjoy to use myUnisa as the fastest medium to communicate with the students".
    - Comments that were rather negative were –
        - "My main concern is that the myUnisa interface is not conducive to the creation of effective online study material."
        - "Granted, myUnisa has improved somewhat over the years, but I will always regret the way in which it was repeatedly, prematurely implemented. It was a great insult to both the Unisa student body and teaching staff -- one of many!"

According to the feedback received from participants, all three the proposed factors regarding the system, played a role in the UX of academic lecturers when using the LMS.

5.4.4 Discussion of Qualitative Analysis for the System

According to the Literature Review (see section 2.3.2.2) the pragmatic quality of a system and specifically the LMS, has an influence on how the LMS is being utilised. This extends to the influence it has on the UX of the user who attempts to perform a specified task (in this case, to facilitate an online course). The objective measurement of usability considers the effectiveness and efficiency. The subjective measurement (user satisfaction) is about the perception and experience of the effectiveness and efficiency of the system (Hassenzahl, 2004; Bevan, 2008).

Congruent with the importance of the pragmatic quality presented in the literature, the participants expressed their frustration with the LMS when it is difficult to upload or change content online. The feedback implied that the system is too slow, not easy to use and difficult to manage. The vocalised frustration indicates that the pragmatic quality (or usability) of the system had an influence on the UX of academic lecturers when using the LMS for facilitation of online courses.

Vrasidas (2004) advocates that suitable pedagogical principles have to be applied for online teaching, but that it needs to be uncomplicated in order to support lecturers to manage the online course (see section 2.3.2.3). The academic participants indicated that the LMS is not flexible to accommodate different course requirements. They also complained that the system is too rigid and unnecessarily complicated to do simple tasks, for example to use scientific notation.

The hedonic quality of the system relates to the user's experience of pleasure and fulfilment when interacting with the system (Hassenzahl, 2004). Corresponding with this theory some of the participants expressed their enjoyment when using the LMS, while others expressed their annoyance and irritation with the system.

5.4.5 Context of Use

Context of use influences the interaction between users and systems. Context refers to the circumstances under which the activity takes place. It reflects on the physical environment, technical environment, tasks and social or organisational environment as the context component (Roto 2006; Maguire 2001a) (see section 2.3.3). In the qualitative data the remarks regarding the organisation, that is, the ODL context strategies, development support, institutional administrative and structural procedures, the technical support in the institution, as well as the available technologies to be used with myUnisa, were considered (see section 5.2).

Figure 5.7 is a presentation of the Context category (codes C1, C2 and C3) by way of the network view from Atlas.ti (Version 6.1) Family code manager. With this view it can be grasped that all three the context factors that were proposed, play a role in the UX of academic lecturers when using the LMS.

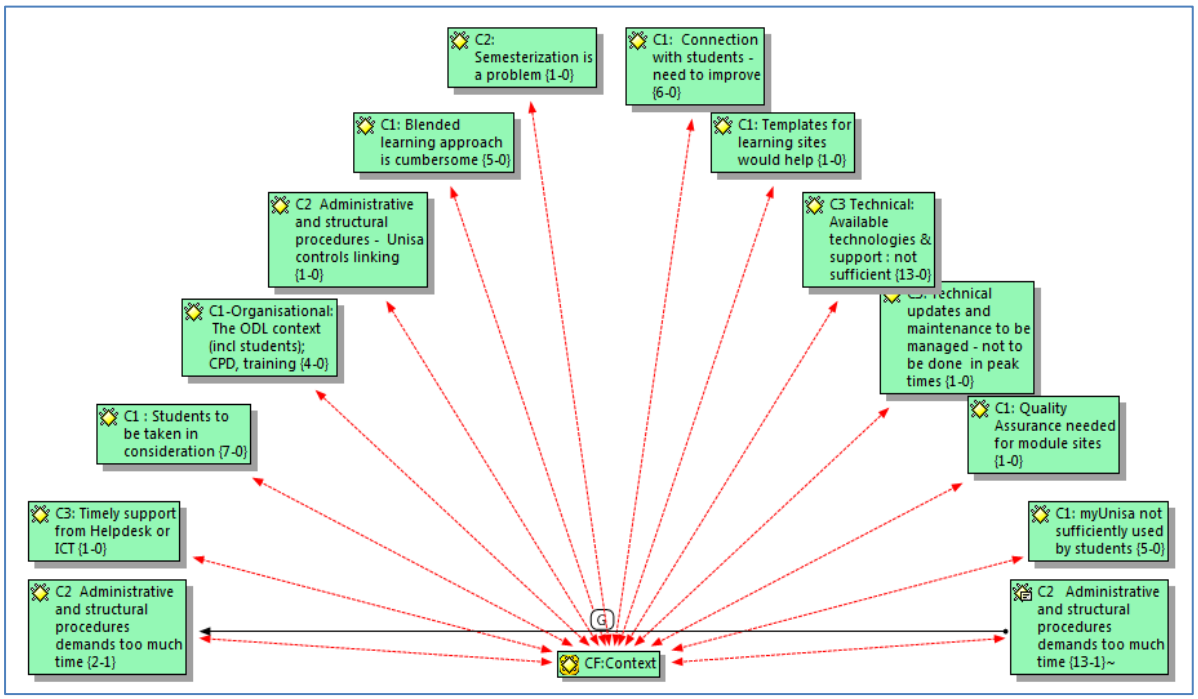


Figure 5.7: Codes applicable to the Context category

According to the number of comments regarding context issues, it seems if these factors have an influence on the utilisation of the LMS. The major problems seem to be the insufficient availability of technologies and applicable support, and the administrative and structural procedures which include the workload. The researcher's reflection of some of the participants' responses received in this regard is as follows:

- A number of participants indicated that the **Organisational context involving the ODL context** (code C1) approach does have an influence on the UX when using the LMS, as depicted in some of the quotes:
    - "Finding ways to engage a changing group of students each year is challenging. There is little time for error here, so there is a lot of pressure to find all the right tools quickly."
    - "I am using a blended approach. I would like to know how many students really use the online material. I am convinced that a lot of time is spent on developing material, and students do not use them at all. It is a duplication of work. If a student does not work, they do not always have internet access,"

- "Not all my students can access it due to their geographic location and not having access to computer/networks."
- "I find the blended approach cumbersome--the main issue is that there is limited time or motivation to maintain a detailed and effective online platform when the system is actually geared towards offline material, which is not designed for online presentation. I'm often informed that the blended approach is necessary because many students still have limited internet connectivity and thus need to be catered for with hard copy; but I think we are doing these students a disservice with this attitude".
- The context of ODL focuses on "removing barriers to access learning, flexibility of learning provision, student-centeredness, supporting students and constructing learning programmes" (Unisa, 2008:2) and this entails to be considerate towards the students. It appeared if the academics' concerns regarding their students' computer skills and access to internet influence the extent of their utilisation of the LMS, for example –
- "The platform doesn't bother me but students find it cumbersome to use. They are much more active using other things like whatsupp and facebook. They often post invitations to go outside myUnisa with their discussions on the discussion form."
- "I love implementing my creative skills on MyUnisa although I would appreciate more participation from the students."; "Find ways that new students at the NQF 5 level are not intimidated to use the technology."
- "If a student does not work, they do not always have internet access".

- According to several of these feedbacks it looks as if the academic lecturers perceive that the students seem distant and not participating in the LMS activities.
- The accessibility of the Organisational **development and training support** (code C1) were mentioned in some feedback from participants:
  - "I would prefer that one person be readily available or even house in the department to enable me to trouble shoot -at the moment there is not support for me at that level and it's frustrating - yet I love the blended mode."
  - "I would make much more effective use of myUnisa if I knew how to use some of the more technological tools. I am not always sure how to use some of the advanced features despite attending various training courses".

- According to the participants' feedback the **institutional administrative and structural procedures** (code C2) have an influence on the UX of the academic lecturers when using the LMS as indicated by the following quotes:
    - "This is a wonderful tool for the facilitation of learning. My only problem is that my administrative demands pull me away from effective use and enjoyment of MyUnisa."
    - "Too heavy workload to properly explore and implement new strategies."
    - "There is a lot of red tape around using myUnisa. For example, ICT needs to give you access to a server before you can upload podcasts."
    - "It depends on whether the system is down and other tuition commitments and administration workload. This impacts on one's use of myUnisa."
    - "The dreaded IPMS compels one to focus on research and to do just enough to keep myUnisa going. In effect, additional work on myUnisa is regarded as wastage of time and something interfering with research productivity".

These comments suggest that the workload and administrative duties prevent the academic lecturers to expand the utilisation of *myUnisa*.

- The following comments demonstrate that the **available technologies, multimedia and technical support** (code C3), seem to have an influence on the UX of the academic lecturer when using the LMS:
    - "The current version of Sakai that myUnisa runs on is outdated -- the tools we have access to, as a result, is also outdated. For example, the discussion forum tool resembles the very first chat-pages that were used in the late 1990s -- this is not adequate for having effective discussions with students."
    - "There is a lot of red tape around using myUnisa. For example, ICT needs to give you access to a server before you can upload podcasts. You are never really sure who to contact on these technical matters and it takes a long time to get it done" and "Linking of social media e.g. facebook, apps etc. to MyUnisa is important. Creating podcasts is sometimes a problem. This should made user friendly".
    - Participants from the science faculty requested better support and available technologies in order to use the LMS for scientific course material as evident from the following remarks:
    - "Does not support scientific writing programs such as chemical drawing tools. It is cumbersome to keep exporting structures."

- "myUnisa is fine if it works as it should, but it often doesn't and the ICT support is sorely lacking. It still has multiple bugs and I've stopped reporting them to ICT because they simply don't fix them. The equation editor, which is very necessary for teaching math, hasn't been working properly for years now".
- There is an opinion that the ICT lack sufficient media availability and support to develop or facilitate course ware via the LMS e.g. "It would be helpful if we could get some software and hardware that will enable us to develop more effective podcasts and vodcasts. The software and hardware that we currently have (audacity, camtasia) with the on-board voice and video recording are slow and not sufficient - but we use it anyway".

According to the qualitative responses all three the proposed factors regarding the context of use, do play a role in the UX of academic lecturers when using the LMS.

5.4.6 Discussion of the Qualitative Analysis for the Context of Use

As stated in the literature (see section 2.3.3) a system is used in a certain context which may influence the use of the system (Maguire, 2001a). The context has an effect on the interaction between users and systems (Jumisko-Pyykkö & Vainio, 2010). The context of use is an important component in the current study since the research question even refers to the context, which is an ODL institution.

The organisational context involving the ODL environment was mentioned as a concern by several participants. The fact that the University's students are at a distance and do not meet face to face with the academic lecturers, creates some uncertainty regarding the students' use and appreciation of the effort that goes into the preparation of online course material. The participants indicated that they would welcome more participation and use of the LMS facilities by the students.

An ODL institution is usually a complex organisation with several levels of responsibilities and a variety of facilitating methods used to transfer content, to provide tuition unobstructed by time and space and to measure outcomes (CoL, 1999). This includes e-learning which constitutes the application of ICTs to enhance distance education, implement open learning policies, strategies, more flexibility and enable extensively distributed learning activities (Davis & Wong, 2007; Roby et al., 2013). However, this 'Openness' generates a great deal of institutional administrative and structural procedures to adhere to. The participants pointed out that it has an impact on their time spent, and being creative and enthusiastic when they facilitate blended courses via the use of the LMS.

The institution needs to provide available technologies, multimedia and technical support to the academic lecturers in order to provide the tools and assistance to facilitate the online courses. Several participants expressed their concern and frustration that there is a lack of sufficient technical support to develop multimedia to use as enhancement of course material on the LMS. There were comments that implied that the terms that were used in the questionnaire regarding "media tools" (for example including graphics, OER, sound and podcasts) were totally unfamiliar to participants.

5.4.7 Findings of the Qualitative Analysis

The participants disclosed in their feedback that they needed to feel competent and indicated that they needed autonomy. They also indicated that their skills have an influence on how and to what extent they are able to use the LMS. According to the feedback the frustration and lack of motivation do have a negative influence on the UX when using the LMS. The conclusion is that participants agreed that all factors identified regarding the *user* (needs, skills and attitudes) do have an influence on the UX when using the LMS (see section 5.4.1).

The participants expressed their frustration with the usability of the LMS, for example: difficulties with ease of use, too rigid and not efficient. The academic participants also indicated that the LMS is not flexible to accommodate different course requirements i.e. the system is not accommodative to all pedagogies. Some of the participants expressed their enjoyment when using the LMS, while others expressed their annoyance and irritation with the system (see section 5.4.2).

The organisational context involving the ODL environment was mentioned as a difficulty by several participants since they experience lack of feedback from the students. They also feel unsure if the students appreciate the time and effort that go into creation of the course material that the lecturers distribute via the LMS.

The participants mentioned that the quantity of institutional administrative and structural procedures to adhere to does have an impact on time spent to be creative and enthusiastic regarding facilitation of online courses via the use of the LMS. Several participants expressed their concern and frustration regarding the lack of sufficient technical support in the institution to develop multimedia to use as enhancement of course material on the LMS.

According to the abovementioned feedback all the previous identified factors were experienced as influential on the UX when academic lecturers use the LMS in the ODL institution. These findings are summarised in Table 5.18.

Table 5.18: Summary of the findings from the qualitative analysis

Abbreviation used in analysis	Factors that could influence the UX when using an LMS	Agree
U1	The academic has certain *needs* when facilitating courses in an online environment	Yes
U2	The *skills* of the academic could influence the UX when using the LMS	Yes
U3	The academic's mood, perspective, attitudes, etc. could influence the UX	Yes
S1	*Pragmatic* quality: The (technical) usability of the system (LMS)	Yes
S2	The pedagogical *appropriateness* of the system (LMS)	Yes
S3	*Hedonic* quality: Pleasure and attractiveness	Yes
C1	Organisational: The ODL context strategies; Development/training support	Yes
C2	Institutional administrative and structural procedures	Yes
C3	*Available technologies* to be used with the LMS e.g. multimedia and collaborative toolsets in a distributed web-based environment, OER. Technical support to use these technologies.	Yes

5.5 Convergence of the Quantitative and Qualitative results

A mixed method design was employed in this research to analyse data collected through administration of the questionnaire (Appendix B). The convergent parallel design was used where the quantitative and qualitative data were concurrently collected with the strands having been kept separate and independent during the analysis. The quantitative results were analysed using statistical methods, and qualitative results built on the quantitative results. The results were combined to give an overall interpretation (see section 4.5.2). The reason the convergent parallel design has been used in this research was in order to obtain complementary data from the same source of collection, during Phase 3 of this study. The conditions of the three units of analysis of the research, namely user, system and context, were thus the same during the qualitative and quantitative data collection.

The quantitative analysis of data collected from academic lecturers via the designed questionnaire and answered on a 5 point Likert scale, were presented and discussed in section 5.3. The responses provided evidence that eight of the nine identified factors do have an influence on UX when using an LMS to facilitate online learning. The quantitative analysis also indicated that the factor `Context - Institutional administrative and structural procedures` do not have an influence on the UX.

The qualitative analysis of participants' views explored the phenomenon of UX and the factors that influence the UX when using LMS in an ODL institution. The qualitative data were necessary to gain insight into the perspectives of the participants regarding the UX and clarified some of the reasons why certain factors influenced the UX of the academic lecturers when they use the LMS. Seventy two participants responded with feedback on the open ended question.

The findings are discussed per components as concluded in the answer to sub research question 2 (see section 1.5). The feedback collated from the expert reviews of the draft conceptual framework are included in Table 5.19 which shows the resemblances in the data collected.

Note that the expert reviewers did not comment on the 'Academic's mood, perspective, characteristics, etc.' and also not on the system's 'Hedonic quality'. It is apparent that these factors were not perceived as important by the reviewers.

Table 5.19: Convergence of Quantitative and Qualitative results

UX components	Abbre-viation used	Factors that could influence the UX when using an LMS	Quantitative - Questionnaire	Qualitative – open ended question from questionnaire	Expert review
User	**U1**	The academic has certain *needs* when facilitating courses in an online environment.	54% participants indicated that they do have needs which influence their UX when facilitating online learning, while 19.6% did not agree.	The most vocalised needs were to have control to change and implement the tools of choice.	More flexibility regarding the utilisation of the LMS with reference to content, system and time would be useful.
	U2	The *skills* of the academics could influence the UX when using the LMS.	60% participants indicated that they do think that their skills influence facilitating online learning, while 12.5 % did not agree.	Coherent with the literature, the participants indicated that their skills have an influence on how and to what extent they are able to use the LMS.	Good examples of the use of the LMS from case studies should be provided to academic lecturers to aid with ways to develop online courses.
	U3	The academic's mood, perspective, characteristics, etc. could influence the UX.	46% participants agreed that their current state of mind does influence their UX, while 19.8% did not agree.	According to the responses the frustration and lack of motivation do have a negative influence on the UX when using the LMS.	
System	**S1**	*Pragmatic* quality: The usability of the system (LMS).	45.6% participants indicated that the usability of the system does have an influence on their UX when using the LMS, while 25% did not agree .	The participants expressed their frustration with the LMS when it is difficult to upload or change content online. The feedback implied that the system is too slow, not easy to use and difficult to manage. Therefore the pragmatic quality (or usability) of the system does have an influence on the UX of the academic lecturers when using the LMS for facilitation of online courses.	Quantity of training and support will depend on the usability of the LMS; The system should be intuitive enough to use with minimal training. "Onscreen help" will improve the UX.
	S2	The pedagogical *appropriateness* of the system (LMS).	47% participants indicated that the pedagogical	The academic participants indicated that the LMS is not flexible to accommodate	Academics who offer certain courses (for example science,

UX components	Abbre-viation used	Factors that could influence the UX when using an LMS	Quantitative - Questionnaire	Qualitative – open ended question from questionnaire	Expert review
			appropriateness of the LMS does influence their UX when using the LMS, while 18.7% did not agree.	different course requirements. They also complained that the system is too rigid and unnecessarily complicated to do simple tasks (for example to use scientific notation).	mathematics and accounting) need supplementary fonts and advanced notation functionalities to compose script when using the LMS.
	S3	*Hedonic* quality: Pleasurable and attractiveness.	Only 36% of the participants did agree that enjoyment to use the LMS does have an influence on the UX, while 18.9% did not agree.	Some of the participants did express their enjoyment when using the LMS, while others expressed their annoyance and irritation with the system.	
Context of use	**C1**	Organisational: The ODL context strategies; Development/training support.	42% of the participants indicated that the ODL context has an influence on their experience when using the LMS, while 26% did not agree.	The fact that students are at a distance and not meet face to face with the academic lecturer creates some uncertainty regarding the student's use and appreciation of the effort that goes into the preparation of online course material. The participants indicated that they would welcome more participation and use of the LMS facilities by the students.	The specific LMS is not adequately accommodating for ODL environment; Negative experiences with other IT tools used in the institution e.g. the J*router* onscreen marking tool, has an negative impact on the UX of the LMS; Lecturers with courses with huge numbers of students could benefit from the use of the LMS - efficient use of time per student – thus improved UX

UX components	Abbre-viation used	Factors that could influence the UX when using an LMS	Quantitative - Questionnaire	Qualitative – open ended question from questionnaire	Expert review
	C2	Institutional administrative and structural procedures.	Fewer participants, only 31.5% indicated that the administrative and structural procedures do have an influence on their experience when using the LMS, while the majority of 35.9% disagreed.	The participants pointed out that it has an impact on time spent to be creative and enthusiastic about the facilitation of online courses via the use of the LMS.	Time constraints regarding the extended expectations for blended learning, as well as the tight teaching schedules due to semester courses are challenging.
	C3	*Available technologies* to be used with *myUnisa*, for example multimedia and collaborative toolsets in a distributed web-based environment, OER. Technical support to use these technologies.	43.8% of the participants indicated that the available technologies and support from ICT do have an influence on their experience when using the LMS, while 26.5% disagreed.	Several participants expressed their concern and frustration that there is a lack of sufficient technical support to develop multimedia to use for course material. There were comments that implied that the terms regarding multimedia tools that were used in the questionnaire are totally unfamiliar to them.	Since "It is not a game or entertainment - it is a task that must be completed. The UX in this specific case will be related to how well the academic is supported in his/her task completion". Tools to create media are challenging (for example Camtasia, podcasts). The additional tools that are available for use by the LMS can only be utilised if the tools are known to the academics.

5.6 Summary

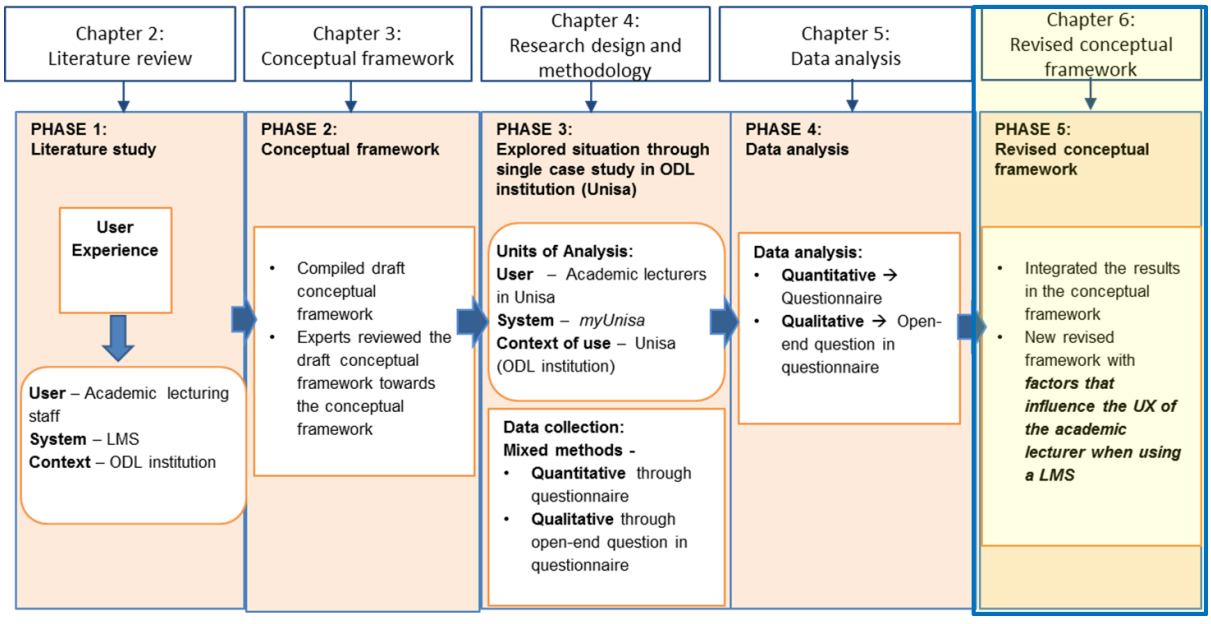
The quantitative analysis provided evidence that nearly all of the nine identified factors do have an influence on UX when using an LMS to facilitate online learning. However, the factor `Context - Institutional administrative and structural procedures`, could not be confirmed as having an influence on the UX.

The feedback that was obtained from the participants on the open ended question in the questionnaire was used to obtain more information regarding the factors that influence the UX when using an LMS in an ODL institution. The information gained from analysing the open ended questions feedback provided insight in some of the real reasons why the academic lecturers experience the interaction with the LMS in a certain way. The qualitative analysis revealed that all nine of the proposed factors have an influence on the UX of the academic lecturers when using the LMS, including the factor `Context - Institutional administrative and structural procedures`.

The converged analysis therefore, confirmed that all the factors, as identified in the conceptual framework, do have an influence on the UX of the academic lecturers when using the LMS.

CHAPTER 6: REVISED CONCEPTUAL FRAMEWORK

CHAPTER CONTENT:



6.1 Introduction

The preceding chapter provided data and information towards answering sub research question 2:

What are the factors that will influence the UX when using the LMS in an ODL institution?

In order to have answered this question, the quantitative data collected in this research were analysed and the findings triangulated with the findings gained from the qualitative data which were collected through the questionnaire completed by the participants. The factors that influence the academic lecturers when they use the LMS were identified and validated through the analysis. It was confirmed that the factors that were identified in the conceptual framework do have an influence on the UX of the academic lecturers when using the LMS.

In this chapter (Phase 5) the contribution of the sub questions are synthesised towards answering the main research question which was formulated as follows:

How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution be represented?

6.2 Contribution of the Sub Questions

In order to have answered the main research question, the two sub research questions had to be answered first. Sub research question 1: **What are the components of the UX when using an LMS?"** was answered in Chapter 2. Resulting from this, it was identified that UX is the consequence of interaction between three components, namely the user, the system and the context (see sections 2.3 and 2.4) within which the interaction occurs. These components were explored as the academic lecturer as the user, the LMS as the system and the ODL institution as the context of use (see section 2.4).

The progression to answer sub research question 2: "**What are the factors that will influence the UX when using the LMS in an ODL institution?",** commenced by identification of associated factors in the literature that could have an impact on the UX of academic lecturing staff in their endeavours to facilitate courses online with the use of an LMS in an ODL institution. These factors were then presented as a draft conceptual framework of factors that could influence the UX of the academic lecturer when using an LMS, also indicating the components (see section 3.1). The use of a conceptual framework enables researchers to reflect on the existing literature, categorise it and

connect it to the research problem, which informs and gives direction to the data collection and analysis. The identified categories assist with organising the inquiry, in order to link the concepts with the research questions (Shields & Tajalli, 2006).

The initial draft of the conceptual framework that was developed in this research was validated by five expert reviewers and their feedback were analysed to identify possible misunderstandings and interpretations of the factors as they were presented in the draft conceptual framework (see section 3.2). An updated version of the conceptual framework (see section 3.3) subsequently guided the further exploration to determine how these revised factors were experienced by the academic lecturing staff as users in the context of a case study analysing an ODL academic institution. A questionnaire was derived from the propositions underpinning the conceptual framework and this questionnaire was administered in the ODL institution (see section 4.5.2.2). Quantitative and qualitative data were collected and analysed to validate the propositions identified in the conceptual framework in order to confirm these propositions as valid factors that could influence the UX when using the LMS in an ODL institution (see section 5.5).

This association of the respective research questions with the applicable sections in the chapters concerned as presented in this research report are summarised in Table 6.1. In Table 6.1 the research questions are mapped to the factors that could influence UX when using the LMS to facilitate online learning in an ODL institution.

Table 6.1: Chapters where the research questions are addressed

Question number	Research question	Addressed in:	Output in section:
Main research question	How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution be represented?	Chapter 2-6	Sections 3.2 and 5.5: The conceptual framework to propose the factors that could influence the UX in an ODL institution Section 6.3: Presentation of the revised conceptual framework
Sub research question 1	What are the components of the UX when using an LMS	Chapter 2	Section 2.3: Components as identified in literature Section 2.4: Components of UX as applicable in this research.
Sub research question 2	What are the factors that will influence the UX when using the LMS in an ODL institution	Chapters 3-5	Section 3.1 – 3.3: Presentation of a conceptual framework with proposed factors Section 4.5.2.2: The propositions were presented as questions in the questionnaire Section 5.2: The factors were presented as an analytic framework to guide the quantitative and qualitative analysis

Question number	Research question	Addressed in:	Output in section:
			Section 5.3.8: Findings of the quantitative analysis Section 5.4.4: Findings of the qualitative analysis Section 5.5: Triangulation of the quantitative and qualitative analysis. Presentation of the outcome of the validated factors (Table 5.18)

6.3 The Revised Conceptual Framework

The answer to the main research question, namely **How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution be represented**?, is displayed as the revised conceptual framework. It depicts the UX of academic lecturing staff in the use of an LMS tool in an ODL institution with Unisa as the case study. The analysis and convergence of the quantitative and qualitative data showed that the factors as identified in the initial conceptual framework (see section 3.3), were indeed confirmed by the participants as being influential factors on the UX when using the LMS to facilitate online learning. A schematic illustration of the framework of factors that influence the UX of the academic when using an LMS in an ODL institution is presented in Figure 6.1.

The following colours are used in the framework to denote the focus on the different components:

- The user (pink)
- The system (purple
- The context of use (green)

This framework (Figure 6.1) proposes and illustrates the UX as it was identified in literature, where UX is seen as the consequence of the interaction between three components, namely the *user*, the *system* and the *context* within which the interaction occurs (Hassenzahl & Tractinsky 2006). Applied to this study, the interaction between these components refers to the user (in this case the academic lecturer); the LMS (in this case myUnisa); and the context of use (in this case Unisa). The UX is how the user perceives the experience of the interaction with the other components.

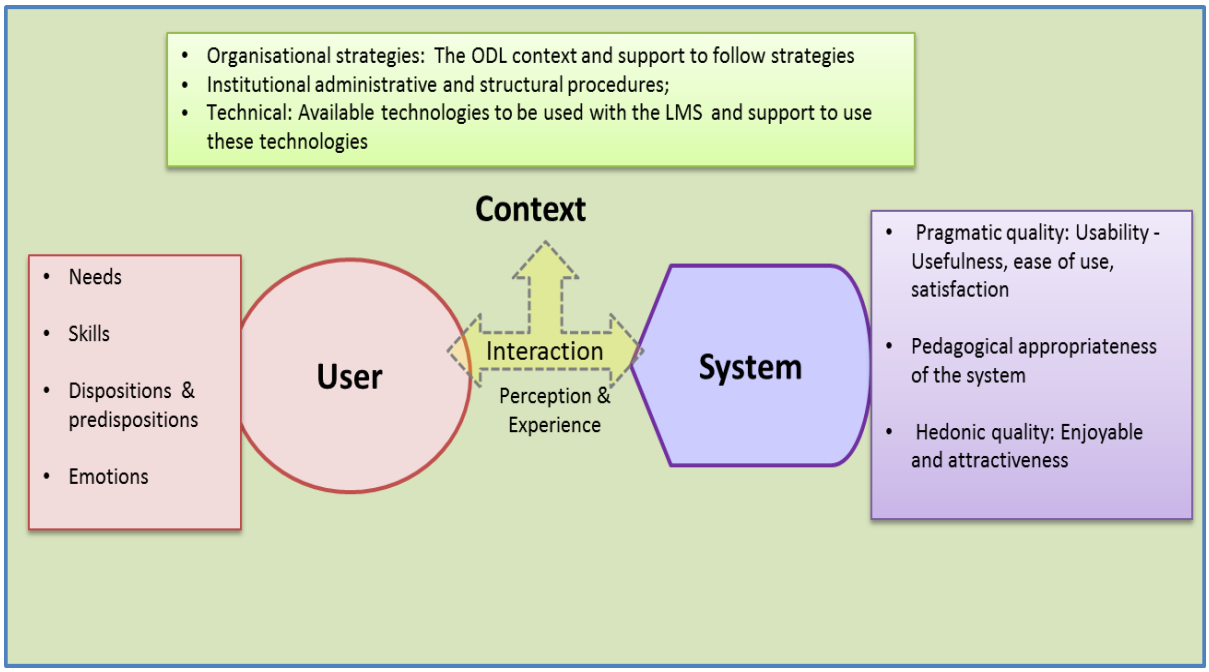


Figure 6.1: Schematic presentation of the framework of factors that could influence the UX of the academic lecturer when using an LMS

The conceptual framework depicted in Figure 6.1, focuses as follows on the three components of the UX, namely the user, system and context along with the interaction between these components:

6.3.1 The User

The user is defined as a person interacting with the system (see section 2.3.1). The user has characteristic needs, motivations, experiences, expectations, predispositions, mental state and resources (Roto, 2007; Roto et al., 2010) entailing the following:

- The needs are interrelated and could include feelings of autonomy, competence and high self-esteem; feelings of relatedness; and need for control and security (see section 2.3.11).
- The skills of the user referred to in this context, mainly relate to the experience of the users with technology, as well as their knowledge regarding pedagogics. Academic lecturers need to understand the complex interaction among three bodies of knowledge, namely content (subject matter), pedagogics (instruction and understanding how the student thinks and learns) and technology (see section 2.3.1.2).
- The dispositions and predispositions of the user refer to their characteristics such as their attitudes, expectations and personalities (see section 2.3.1.3).

- The emotional state of the user affects how the person feels, behaves and thinks. Positive or negative feelings have a considerable impact on how users interact with technology (see section 2.3.1.4).

How the system will be perceived depends thus on the person's skills, needs and state of mind which will consequently influence the UX.

6.3.2 The System

The system is defined as the structure required for the product under examination to work or to be useful. This includes the characteristics of the system (e.g. complexity, purpose, usability and functionality) (as discussed in section 2.3.2). The following factors regarding the LMS system have been identified:

- Pragmatic quality or the usability of the system is connected to the users' need to achieve behavioural goals. Usability has been expressed in terms of the effectiveness, efficiency and satisfaction of the users who performed specified tasks (see section 2.3.2.2).
- The pedagogical appropriateness of the system suggests that the potential of the LMS can only be reached if lecturers are knowledgeable in developing their pedagogical autonomy and to become proficient in the use of technical tools that are suitable for a specific course (see section 2.3.2.3). .
- The hedonic quality of a system, which includes pleasure working with the system, or the attractiveness of the system, implies the extent to which the system affords the user with the experience of feelings such as joy and pleasure. It refers to the system's hedonic quality, which in a particular situation leads to consequences such as emotions of satisfaction or excitement (see section 2.3.2.4).

The system needs not only to comply with high technical requirements, but the user needs to experience the system as appropriate for the tasks at hand. Accordingly, the user's experience of the pragmatic and hedonic qualities will influence the overall UX. The UX is about the user's perception of the quality of a system, rather than properties of the system itself.

6.3.3 The Context

The system is used in a certain context, with certain characteristics. It is utilised within a specific range of technical, physical and social or organisational environments that may influence its use. The context of use in this research is the ODL institution, with its requirements and demands. The factors that will influence the UX when using the LMS in an ODL institution were proposed and tested in the case study and were identified as follows:

- Organisational strategies: Some of the ODL's strategies' goals are to implement technology-enhanced assessment practices and to promote the adoption and use of technology in teaching, learning, research and community engagement (see section 2.3.3.1 and section 2.3.3.2). The ODL context includes the professional development of and training support to academic staff.
- Institutional administrative and structural procedures: According to the Unisa Institutional Operational Plan 2012 – 2013 (Unisa, 2013), there are specific targets to be met, inter alia to progress towards online learning. Concerns are that teaching, research and administrative tasks, which are key performance areas, are increasing and involvement with online learning by means of the LMS is just adding to workload without it being a key performance area (see section 2.4.3.3).
- Technical resources: Technical support and instructional resources should be provided by the institution to provide access to academic lectures to supplement technologies to be used with *myUnisa* e.g. multimedia and collaborative toolsets in a distributed web-based environment; knowledge and exploration of OER use (see section 2.3.3.3).

The circumstances or context wherein the system is used has an influence on how the use of the system is perceived by the user.

6.3.4 Interaction

In this framework the effect of the interaction between the components user, system and context, is considered as the perceived UX. Hassenzahl and Tractinsky (2006) specified that UX is the consequence of interaction between three components, namely the user, the system and the context within which the interaction occurs (see section 2.3). The user perceptions are a

consequence of the interaction with the system. The outcome of this interaction determines the true value of a system (see section 2.2.1).

The conceptual framework is displayed in Table 6.2 where the three components, the factors and indications of the sections where they have been discussed, are shown in terms of the colour codes awarded to them above.

Table 6.2: Conceptual framework: Components and factors that could influence the UX of the academic lecturer when using an LMS

UX components	**Factors that could influence the UX when using an LMS**	**Sections of discussions and findings in this study**
User	The academic has certain ***needs*** when facilitating courses in an online environment	Section 2.3.1.1; Section 5.3.4.1; Section 5.4.1
	The ***skills*** of the academic could influence the UX when using the LMS	Section 2.3.1.2; Section 5.3.4.2; Section 5.4.1
	The academic's **mood, perspective, characteristics**, etc. could influence the UX	Section 2.3.1.3; Section 2.3.1.4; Section 5.3.4.3; Section 5.4.1
System	***Pragmatic*** quality: The (technical) usability of the system (LMS)	Section 2.3.2.2; Section 5.3.5.1; Section 5.4.2
	The pedagogical ***appropriateness*** of the system (LMS)	Section 2.3.2.3; Section 5.3.5.2; Section 5.4.2
	Hedonic quality: Pleasure and attractiveness	Section 2.3.2.4; Section 5.3.5.3; Section 5.4.2
Context of use	**Organisational strategies:** The ODL context ; Development/training support	Section 2.3.3.1; Section 2.3.3.3; Section 5.3.6.1; Section 5.4.3
	Institutional administrative and structural **procedures**	Section 2.3.3.2; Section 5.3.6.2; Section 5.4.3
	Technical: ***Available technologies*** to be used with *myUnisa* e.g. multimedia and collaborative toolsets in a distributed web-based environment, OER. ***Technical support*** to use these technologies.	Section 2.3.3.4; Section 5.3.6.3; Section 5.4.3

The conceptual framework is important to inform the professional development teams regarding the support and training of academics that have to use the LMS for facilitation of courses. Developers of LMSs should take notice to find ways to accommodate different pedagogies in the system and to

improve the usability. The conceptual framework could inform the management of the ODL institution concerned regarding decisions and strategies to enhance the use of ICT in teaching and learning.

6.4 Contextualisation of this Study

Following the presentation of the revised conceptual framework, the study can now be reviewed to consider how it fits into current literature about UX. The question could be asked: "What does this conceptual framework add and what is its contribution to the existing literature?" In reflecting on this question, the following UX notions and viewpoints should be considered:

- In contextualising this research into the South African perspective, other recent UX studies and their findings have to be noted.
- UX is a dynamic topic relevant to South African Higher Education Institutions.

In dealing with these notions, Pretorius, Hobbs and Fenn (2015) investigated the UX landscape of South Africa to gain insights into the current status of UX maturity in the country. The researchers wanted to find the reasons why UX practices are not applied in organisations, and what the challenges are to change the status quo to improve UX practises in organisations (Pretorius et al. 2015). Their study confirmed previous findings which determined that organisations cannot adhere to UX guidelines if there is no sufficient management support, adequate training for staff, awareness of UX, routine practices of UX and application of usability methodology and user-centred design processes (Pretorius & Calitz, 2014). Pretorius et al. (2015) accordingly address the components of the needs and skills of the user, the usability of the system and the organisational context.

Coherent to the findings of Pretorius and Calitz (2014), the current study found that the management support of the institution affects the prioritisation of tasks of the academic lecturers, which influence their motivation and dedication to utilise the LMS. The lecturers also indicated that they need specific training to create or use multimedia, which concurs with the study of Pretorius and Calitz (2014).

Cognisance is taken of Van Staden, Van Biljon and Kroeze's (2015) study that investigated the UX in the Higher Education (HE) context and presents an UX evaluation framework for online moderation or e-moderation. The constructs that the framework proposes for UX evaluation of an e-moderation system are inter alia, the people, the HE organisation, the system and the UX of the pragmatic and

hedonic qualities of the system. These constructs correlate with elements in the current study which are the user (people), the system (e-moderation system) and the context (organisation).

The questionnaire used in this study was generated from the propositions in the conceptual framework for factors that could influence the UX of the academic when using an LMS. These derived questions were then combined with ten questions from the SUS questionnaire that were customised and contextualised to be suitable to use for an LMS in the context of the ODL institution. The SUS questionnaire was chosen to be used as the usability metric for UX in this research. The question could be asked why the researcher did not use the existing, available and widely used UX questionnaires - for example, the UX questionnaire (UEQ) (Laugwitz, Held & Schrepp, 2008; Schrepp, Hinderks & Thomaschewski, 2014) or the Attrakdiff questionnaire (Hassenzahl, Burmester & Koller, 2003, 2007; Wetzlinger, Auinger & Dörflinger, 2014).

Considering the literature (Laugwitz, Held & Schrepp, 2008; Schrepp, Hinderks & Thomaschewski, 2014) the UEQ consists of 26 questions which mainly measure the concept of attractiveness, composed by the concepts of pragmatic quality (perspicuity, efficiency and dependability) and hedonic quality (stimulation and novelty). It seems that these concepts are only considering two of the UX components, namely the user and the system. Questions about the circumstances in which the system is used, or in other words the 'context' component, were not included in the UEQ questionnaire. Therefore, this questionnaire could not be used.

The AttrakDiff questionnaire from Hassenzahl et al. (2003) measures hedonic stimulation, identity and pragmatic qualities of software products, with a total of 28 questions. The evaluation focusses on how the attractiveness of the system (or product) is experienced, in terms of usability and appearance and whether optimisation is possible. The items that are tested are pragmatic quality, hedonic quality and attractiveness. It seems if the 'context' component was also omitted in this questionnaire. Therefore, this questionnaire could also not be used.

The data analyses of the current study showed that the context component has a significant impact on the UX. Consequently, it is necessary to include questions in the before mentioned questionnaires which would take the circumstances of the user when the system is used, into consideration. This requirement informed the decision to develop a new questionnaire which included the factors that could influence the academic lecturer when using the LMS in an ODL institution associated with the three identified components (user, system and context). A

contribution of this study is thus to include the context as a construct in the data collection instrument of UX studies.

A study that was done by Ssekakubo, Suleman and Marsden (2011) established that a reason why LMSs fails at universities is not because of the choice of technology (or system), but rather due to institutions' lack of user-support to facilitate e-learning. This finding supports the notion that the context has a noteworthy impact on the UX. In turn, Zaharias and Pappas (2016) propose in their research entitled *A UX perspective of quality management of LMSs*, that the e-learning context requires additional dimensions for pragmatic quality measurement of an LMS. They propose four contextual evaluation dimensions in e-learning, which are *pragmatic quality*; *authentic learning*; *autonomy and relatedness*; and *motivation and engagement*. Learning and instructional designs should be considered as additional dimensions for usability. The dimension of *authentic learning* has been included to accommodate different learning methods and styles. The dimension of *autonomy and relatedness* attends to the student's need to be involved in authentic learning activities and to be part of the learning community. The dimension of *motivation and engagement* emphasises the influence that extrinsic and intrinsic motivation can have on the learning experience. This relates to engagement of the learner which needs intriguing and trendy technology to stay committed in the learning process. All of these dimensions endorse the importance of the *context of use* or circumstances where the user interacts with the system.

6.5 Summary

The identification of associated factors in the literature that could have an impact on the UX of academic lecturing staff in their endeavours to facilitate courses online with the use of an LMS in an ODL institution, were presented in the conceptual framework. The identified components and factors were categorised in order to link the concepts with the research questions.

The conceptual framework was the outcome of a study which commenced with a literature review regarding UX, the user, the system and the context of use. These concepts were then further explored in the literature by extending the components user to the academic lecturer; system to the LMS; and extending the context of use to the ODL institution. The draft conceptual framework was compiled by the arrangement of UX components and identified factors. Subsequently, the draft conceptual framework was evaluated by experts and after the necessary amendments were done, the data collection instrument was derived from the propositions in the framework. After the

quantitative and qualitative analyses were converged and triangulated, the findings were incorporated to present the revised conceptual framework.

The appropriateness of the conceptual framework was reflected on by considering existing recent research that has been conducted regarding UX. The research sources consulted for this purpose, focused on research of UX maturity in South Africa, another UX study in HE in SA, UX in management of an LMS, and UX questionnaires.

CHAPTER 7: CONCLUSION

CHAPTER CONTENT:

7.1 Introduction

In this final chapter, the research results are briefly summarised with reference to the research questions. A summary of the chapters of the dissertation is given. An overview of the study is discussed and the success of the research in answering the research question is reviewed. The contributions made by this study are reviewed and an overview of limitations and restrictions is given. A reflection that leads to suggestions for further research is followed by concluding remarks.

7.2 Summary of Chapters

This research report is divided into seven chapters, each with the following focal points:

- Chapter 1 – Introduction

This chapter defines and outlines this study. The research rationale, research problem and the context of the study are set as background to the research questions.

- Chapter 2 - Literature review

The results of a literature review of UX and how it relates to the context of this study are presented in this chapter. The chapter gives a view of UX mentioning different viewpoints on experience and UX with an explanation of UX as part of HCI. In addition the literature study explored the factors that

influence the UX when using an LMS. The identification of components of UX contributed to answering sub research question 1.

- Chapter 3 - Conceptual framework

This chapter provides a draft conceptual framework of factors that could influence the UX of the academic lecturer when using an LMS, constructed from the identified three units of analysis, the user, the system and the context. It also identifies the factors that influence the UX of academic lecturing staff using the LMS in an ODL institution, as referred to and described in the literature. This draft conceptual framework was reviewed by five experts in the fields of education, HCI and ODL. Subsequently, the draft conceptual framework was amended to present the conceptual framework. This phase aimed to initiate the answering of sub research question 2 which relates to the factors that influence the UX when using an LMS in an ODL institution.

- Chapter 4 - Research design and methodology

In this chapter the design and methodology applied in the research to assist with the answering of all the research questions are presented. The research design specifically catered to the needs of this study to ensure that the required data would be collected and validated for reliability. The data collection process is described, including the construction of the data collection instrument, the questionnaire and how the process was administered. The focus here is also on explaining how the questionnaire was derived from the propositions in the reviewed conceptual framework and distributed to the participants in the ODL institution.

- Chapter 5 - Data analysis

This chapter consists of the analyses of the quantitative and qualitative data, which was done independently in accordance to Creswell and Clark's (2011) outline for a convergent parallel mixed data collection. The quantitative analysis provided evidence that eight of the nine identified factors do have an influence on UX when using an LMS to facilitate online learning. The qualitative analysis provided insight into some of the real reasons why the academic lecturers experience the interaction with the LMS in a certain way. It revealed that all the factors have an influence on the UX of the academic lecturers when using the LMS.

- Chapter 6 - Revised conceptual framework

The contribution of the sub research questions are discussed in this chapter, with the findings of the data analyses having been integrated in the draft conceptual framework in order to present the conceptual framework. The study is contextualised in recent research regarding UX. This includes research on UX maturity in South Africa, UX in management of an LMS and analysing UX questionnaires.

- Chapter 7 - Conclusion

This chapter gives a short overview and summarises the research process, contributions and recommendations of the study.

The research layout and process is summarised and displayed in Figure 7.1

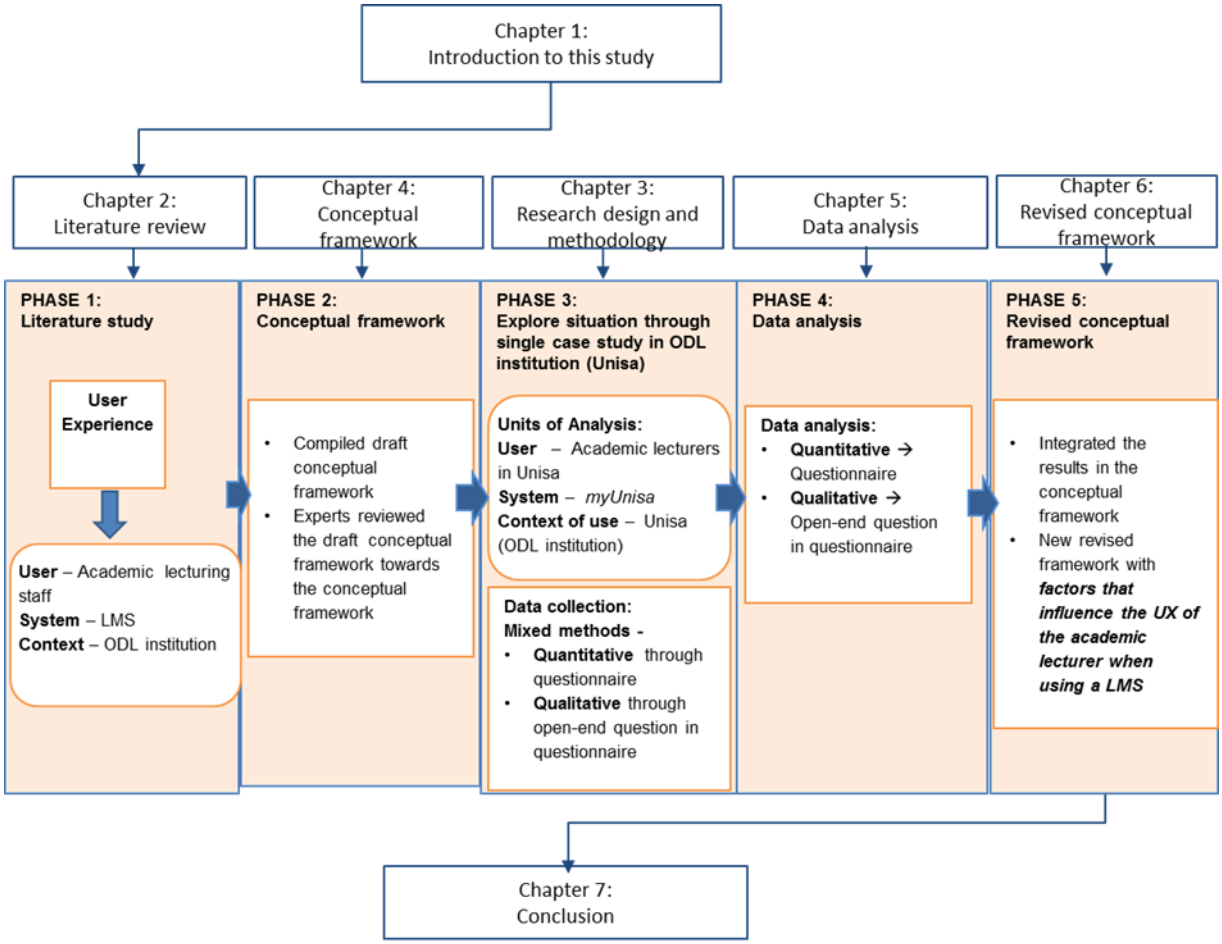


Figure 7.1: Summary of research layout and process

7.3 Overview of the Study

An overview of the study is presented in this section. The process of answering the research question is explained (section 7.3.1) and is a reflection of the key findings of the research (section 7.3.2).

7.3.1 Research Process

The aim of the research was to answer the following research questions:

How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution, be represented?

The sub research questions that directed and guided the study towards answering the main research question are the following:

Sub research question 1: ***What are the components of the UX when using an LMS?***

Sub research question 2: ***What are the factors that will influence the UX when using the LMS in an ODL institution?***

The research applied a single case study as a strategy and used both the qualitative and quantitative research designs for data collection by adapting the convergent parallel mixed method research design to answer the main research question.

The responses from the open-ended question in the questionnaire provided (qualitative) explanations for some of the quantitative findings and provided interesting insight in the feelings, thoughts and experiences of the participants. It contributed positively towards richer findings.

The research process consisted of five phases. The execution of this process is summarised in Table 7.1.

Table 7.1: Summary of the research process

Phase	Description
Phase 1 (Chapter 2)	Process: **Literature study** Aim: The literature study's aim was to answer the first sub research question and examine existing relevant literature to identify the factors of UX to commence with answering of the second sub research question.
	Activity: The study explored the literature to determine the components of UX and to identify the factors that influence the UX when using an LMS.

Phase	Description
	Output: The *components* of the UX that would serve as the units of analysis for the single case study towards answering of sub research question 1. The identified components were the *user*, the *system* and the *context of use*. Identified *factors* that could influence the UX when using an LMS towards the compilation of the draft conceptual framework.
Phase 2 **(Chapter 3)**	Process: **Conceptual framework** Aim: To compose a conceptual framework that represents the components and factors that could influence the UX of academic lecturing staff using the LMS in an ODL institution.
	Activity: A draft conceptual framework was constructed from the identified units of analysis in Phase 1. Current factors that influence the UX of academic lecturing staff using the LMS in an ODL institution as identified from literature were included as propositions. The draft conceptual framework was then reviewed and validated by five experts in the fields of education, HCI and ODL. This was done in order to ensure the comprehensiveness of the content, the correct use of language in the statements and to confirm the applicability and relevancy from the academic viewpoint in the ODL environment. The feedback was incorporated to do the necessary amendments to the draft conceptual framework.
	Output: Presentation of a conceptual framework. The validated conceptual framework based on theories, propositions and structures from literature was presented in order to guide data collection and analysis.
Phase 3 **(Chapter 4)**	Process: **Research design and data collection** Aim: To present the research strategy to effectively address the research problem. To explain the administration of the data collection process.
	Activity: This research study adopted an interpretivistic research philosophy. The research was conducted in five phases and applied a single case study design (Yin, 2003). The data collection instrument accommodated both the quantitative and qualitative data collection methods in adapting the convergent parallel mixed method as outlined by Creswell and Clark (2011). To explore how the UX presents itself within the case, a questionnaire was derived from the propositions in the reviewed conceptual framework. In order to ensure that the questionnaire captured the necessary data, the quantitative section of the questionnaire was evaluated by a statistician and pre-tested on a small sample group of participants. Insights gained were incorporated in the final version of the questionnaire.
	Output: The questionnaire was distributed to 1 640 academic staff members in the eight academic colleges at Unisa which use the LMS (*myUnisa*) to facilitate courses online.
Phase 4 **(Chapter 5)**	Process: **Data analysis** Aim: To apply statistical techniques to describe and evaluate data in order to find the answers to the research questions.

Phase	Description
	Activity: The data were analysed independently in accordance to Creswell and Clark's (2011) outline for a convergent parallel mixed method. There were 158 respondents. The software packages SAS ®, IBM SPSS® and MS Excel ® were used for analysis and visualisation of the quantitative data. The feedback from the open ended question in the questionnaire, with 72 respondents, was combined into one document, which was then used as primary document in Atlas.ti ® for coding purposes. In this study mixed method research refers to the combined use of quantitative and qualitative data collection methods in the same research. The motivation of mixed method methodology is strengthened by the principle of triangulation, which implies that more than one measurement procedure is used when investigating a research problem in order to enhance confidence in the findings.
	Output: The quantitative data collected provided evidence that eight of the nine identified factors do have an influence on UX when using an LMS to facilitate online learning. However, the responses to the factor `Context - Institutional administrative and structural procedures` showed that slightly more participants (35.9% in contrast to 31.5%) indicated that the institutional administrative and structural procedures do not have an influence on the UX. The qualitative analysis explored the phenomenon of UX and the factors that influence the UX when using LMS in an ODL institution. The qualitative data provided more insight in the perspectives of the participants regarding the UX and clarified some of the reasons why some factors influence the UX of the academic lecturers when they use the LMS. According to the qualitative data, all of the nine identified factors do have an influence on UX when using an LMS to facilitate online learning.
Phase 5 **(Chapter 6)**	Process: **Revised conceptual framework** Aim: To present the revised conceptual framework towards answering the main research question - How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution, be represented?
	Activity: The conceptual framework which resulted from phase 2 was revised and amended to present an updated contextualised framework. The collected and analysed data were integrated into the conceptual framework.
	Output: The study is concluded with the conceptual framework that represents the UX of academic lecturing staff in the use of an LMS tool in an ODL institution, to answer the research question: How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution be represented?

7.3.2 Reflection of Key Findings

This research report documents the exploration of the research problem articulated in Chapter 1 (section 1.5). The research was conducted in the context of an ODL institution. The findings were derived from the literature, from the expert reviews of the conceptual framework and from the

survey on the factors that influence the UX of academic lecturing staff when they use the LMS to facilitate online courses in an ODL institution. The key findings of this research are reflected on as follows:

- Sub research question 1:

What are the components of the UX when using an LMS?

Sub research question 1 was addressed in Chapter 2 and Chapter 3 of the dissertation. Chapter 2 provided a background to research through the literature review of UX and how it relates to the context of this study. The view as presented by Hassenzahl and Tractinsky (2006) specified that UX is the consequence of interaction between three components, namely the user, the system and the context within which the interaction occurs was adopted for this study.

Based on the literature, the user, the system and the context, were identified as components of UX that formed the units of analysis for the case study towards the conceptual framework as a representation of the UX of academic lecturing staff in the use of an LMS tool in an ODL institution.

- Sub research question 2:

What are the factors that will influence the UX when using the LMS in an ODL institution?

Sub research question 2 was addressed in Chapters 2 to 6 of the dissertation. The probable factors were identified according to the literature (Chapter 2, see Table 2.6). These factors were listed as propositions in a draft conceptual framework which were then reviewed by five experts. After considering the ratings and recommendations from the reviewers, a conceptual framework was presented (Chapter 3). The proposed factors were converted into questions which were then tested in the case study with academic lecturers using an LMS in an ODL institution (Chapter 4). The quantitative and qualitative feedback from the participants were analysed and converged (Chapter 5). The outcome reflected that the proposed factors did indeed influence the UX of the academic lecturer when using the LMS in an ODL institution. Therefore, the factors identified present a valid response to sub research question 2.

- Main research question:

How can the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution be represented?

The main research question addressed in this study relates to the factors that will influence the UX when using the LMS in an ODL institution. Dealing with the two secondary research questions led to the realisation of the main research question. The factors that influence UX of the academic lecturer when using the LMS in an ODL institution were identified through literature, verified and enhanced through reviews and quantitative and qualitative data collected through a questionnaire. The conceptual framework as presented in Chapter 3 was summarised and the UX of academic lecturing staff in their endeavour to facilitate courses online with the use of an LMS in an ODL institution, is represented as the revised conceptual framework in Chapter 6.

7.4 Significance and Contribution of Research

UX is a dynamic research area, as is evident from recent research publications (see section 6.4). From an academic perspective the research is important because this research investigated the UX of the academic lecturing staff when they use the LMS in an ODL institution. The theoretical contribution of a framework for representing the UX of academic lecturing staff in the use of an LMS begins to fill a gap in the literature (see section 1.9) since evidence of previous studies on UX in the ODL context could not be found. The theoretical contribution is a conceptual framework which was validated twice. Firstly by the expert review and secondly by the analysis of data collected through a questionnaire. According to this evidence it can be deduce that the nine proposed factors do indeed have an influence on the UX of academic lecturers when using an LMS in an ODL institution.

A contribution of this study is that the context component was included as a construct in the data collection instrument. A new questionnaire was developed which included the factors that could influence the academic lecturer when using the LMS in an ODL institution associated with the three identified components of user, system and context.

As a contribution to literature on the subject of UX and evidence of the novelty, relevance and rigor of this research, a paper submitted by the candidate and colleagues on the quantitative analysis, was accepted and presented at a peer-reviewed ACM International Conference Proceeding Series (De Kock, van Biljon & Botha, 2016).

There are several reasons why the contribution in the form of the findings from this study, are important to the academic body of knowledge. The reasons being that the findings of the study-

- offer new insights into the UX phenomena in the context of ODL;

- created an awareness of the factors that could influence the use of an LMS;
- confirmed that the context of use or circumstances play an important part in the UX of the academic lecturer with the use of an LMS;
- offer a comprehensive model for the understanding of the factors that influence the UX when using an LMS which can serve as basis for future research in other contexts;
- offer a comprehensive model to use for further exploration of factors that could influence the UX when using an LMS; and
- some of the findings were disseminated at the annual South African Institute of Computer Scientists and Information Technologists (SAICSIT 2016) which is a premier conference in South Africa.

Part of the significance and contribution of this study, is that it could serve as a basis for further research initiatives regarding UX of academic lecturers in other educational institutions. The practical significance and contribution of this study are that it is instrumental in establishing a better understanding of the UX and the practical challenges involved for academic lecturers that have to facilitate learning in an ODL institution. It is therefore recommended that system developers (LMS developers and supportive development programs) should consider the conceptual framework for guidance to improve utilisation and acceptance of the LMSs in educational institutions.

The research findings from this study are also important to professional development initiatives and management of the educational intuitions to be informed when proposing strategic plans. The needs and concerns of the academic lecturer have to be considered to enhance the utilisation of the LMS for facilitation of learning. Therefore, taking this and the general outcomes of this research into consideration, in disseminating the research, a report of recommendations will be presented at a colloquium to inform the Unisa management involved with teaching and learning, the CPD team and the ICT team. The intention would be to emphasise the following:

- The implications that the strategic plans regarding blended learning have for the academic lecturer, especially the workload to accommodate the increased responsibilities to offer blended learning courses.
- The fact that the framework provides information that the professional development team should consider to enable the academic lecturing staff to incorporate the technology to deliver quality courses online through the use of an LMS.

- The needs of the academic lecturers to be considered so that it could be attended to with effective development interventions.
- The essential adjustments to the LMS regarding the administration rights (to be done by ICT) so that academic lecturers could experience autonomy and independence when interacting with the LMS.
- The fact that the findings offer insight into circumstances in the workplace that could hinder utilisation of the LMS.
- The fact that the findings offer a better understanding of the challenges associated with the use of an LMS in an ODL institution.

Going beyond Unisa, the findings could also be provided as input to the Sakai (Open Source) users group to be of assistance with the enhancement of the Sakai development platform in order to improve the UX for academic lecturers that use the LMS. The results of the research could therefore, also be of broader significance and contribute to other Higher Educational institutions with academics that use the LMS.

Considering the disruptive consequences over the last months at the South African universities regarding the "Fees must fall" protest movement (SABC, 2016), more residential universities are obliged to change to blended learning and this forefronts to the use of LMSs by these universities. This conceptual framework could inform these educational institutions to improve the support provided to encourage the utilisation of the LMS and to enhance the UX of academic lecturing staff when using the LMS.

In finding answers to the research questions that gave rise to this research undertaking, the knowledge gained from this study in essence resulted in a summarised and relevant conceptual framework of elements that influence the UX of academic lecturers when using an LMS. Taking cognisance of this framework and the knowledge gained through developing it, should inform educational institutions to improve the support provided to encourage the utilisation of the LMS and to enhance the UX of academic lecturing staff when using the LMS, to the advantage of their students.

The limitations of the study are discussed in section 7.5.

7.5 Limitations of the Research

The limitations in research need to be declared in order to address the restrictions of the scope of the study (Hofstee E., 2006). Therefore, the limitations of this study are now briefly discussed.

The role of generalisability in terms of context and sample should be noted. In view of the fact that in this research, the UX of academic lecturers with the use of only one LMS, was investigated in only one ODL institution, the generalisability of the findings across LMS's is limited.

In addition, as far as the generalisability of the time dimension is concerned, the researcher is aware that quality of UX could change over time and thus would alter the UX over time. It is therefore emphasised that for this study the data collection is mainly a reflection after the system has been used, or of the overall UX of the system at a given time. Evaluation of the whole UX could be expanded to include the expectations of academic lecturers before using the system, interactions while using the system, to reflections after using the system.

The participants who conducted the expert review were all computer literate and familiar with the use of online systems. The shortcoming is that they were very confident in the use of the LMS and did not include or represent the novice users. This may be a reason that most of the expert participants did not agree that more training is needed. However, the high level of computer literacy had an advantage in the sense that the issues identified were more general and not limited to technical difficulties.

7.6 Possible Future Research

Further research is necessary to investigate the applicability of the conceptual framework of the UX of academic lecturing staff when using the LMS to other universities. This study was conducted in only one ODL institution. Therefore, it would be a validation of the framework if the study could be repeated in other ODL institutions or residential universities. The same data collection instrument could be adapted (e.g. name of the LMS) to be used at other institutions.

Further investigation and statistical analysis could be performed with the data of the current research to determine if specific groups of participants have different perceptions of UX. The analysis can continue to determine if there is a correlation between the various categories of the biographical properties of participants. For example, the effects of years of experience with the LMS in correlation with the extent to which blended learning techniques are used. Analyses of variance

could then be performed to indicate the statistical significance of the effect of specific biographical properties on perceptions of the influence of the nine factors on UX of academic lecturers. For example, how does the effect of *blended learning* and *computer skills* impact perceptions that the academic lecturer's mood could influence UX?

The study has revealed that the degree of student involvedness in the LMS has an influence on the academic lecturer's UX and vice versa, the dedicated academic lecturer also has an influence on student's participation. Research could be done to explore the relationship between the level of academic lecturers' involvement in the LMS and the UX of the students. A framework could be proposed to improve the connectedness between lecturers and students.

7.7 Reflections

I believe that the decision to use different methods for data collection and validation of propositions in this research, based on a mixed methods strategy to investigate the specific problem was of great value. The evidence obtained made sense and settled into place in the process of triangulation, when the qualitative information from the open ended question in the questionnaire confirmed and provided more insight into the quantitative information that was obtained from the statistical analyses.

The process to compile the research study has been experienced as an educating journey in which incredible growth in terms of research awareness and capability were necessary. I became aware of the true meaning of the saying "the more you know, the more you know how little you know" and by presentation of this research I am just able to address a little portion of understanding of the research and works created by notable thinkers of the past.

So, what is the conclusion after experiencing this research journey? It is that the human being remains the main actor in the exploration and research for evolving and innovative technologies. These technologies are only instruments to serve the human being. If the apparatus does not serve the human being to progress, improve or positively experience life, the instrument has unfortunately failed.

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APPENDIX A: DRAFT CONCEPTUAL FRAMEWORK INCLUDING PARTICIPANT CONSENT FORM

User Experience **of academic staff in the use of the learning management system tool (*myUnisa*):**

Participant consent form

This is to get consent for your participation in the research conducted by Estelle de Kock. The research is for an MSc in Computing at Unisa, under the supervision of Professor Judy van Biljon (Email: Vbiljja@unisa.ac.za) and Dr Adele Botha (Email: abotha@csir.co.za). The purpose of this research is to gather information regarding the user experience in the use of the learning management tool, *myUnisa.*

The researcher has obtained ethical clearance from the School of Computing in the College for Science, Engineering and Technology. Permission to use staff from Unisa as participants has been obtained from the Research Directorate at Unisa.

The input you provide will be treated confidentially. All data will be used in summary form without reference to any individual. Participation in this research study is voluntary, and you have the right to, at any time, withdraw or refuse to participate.

Participant consent

I have read and understand all the above. I willingly choose to participate in this study.

Full name (optional) _____

Date: _____ **Signature:** _____

Dear Colleague,

Thank you for your willingness to review the Conceptual framework in this research. Please note that our main focus is not to evaluate the Learning management system (LMS), *myUnisa*, but to explore the *user experience* of academic staff when they use the LMS as the main teaching and facilitation tool for online course delivery. The framework as it is sent to you has been derived from relevant literature. The purpose for this review is to obtain input from experts regarding the applicability, conciseness and completeness of the factors that could influence the academic's user experience when using the LMS. Through your feedback I seek to improve on the factors of the framework in order to expand the questionnaire that will go out to the academics for data collection in the case study. I include some background and explanation of the terminology. Please note that the references have been deleted for this document, but I will be pleased to provide the references on request.

1. Purpose of the study

In response to the need for the improvement of the confidence and competence of academic staff with the use of technology this research will explore the user experience of academic staff when they use the LMS as the main teaching and facilitation tool for online course delivery. The study will examine the use, perceptions and training needs of the academic staff and propose a framework of factors that will enhance the academic staff's user experiences with the use of the LMS in Unisa.
The resulting guidelines can assist Unisa, as well as other educational institutions, in responding to the user experience of academic staff when using LMSs and it can inform the professional development initiatives, in developing training programs that would enable the academic staff to incorporate the technology to deliver courses online through the use of a LMS. In addition it could provide input to the Sakai (Open Source) users group to be of assistance with the enhancement of the Sakai development platform in order to improve user experience for the instructor that uses the LMS.

2. User experience

In Human computer Interaction (HCI) the traditional usability focuses on user cognition and user performances during execution of tasks and interacting with technology. User experience focuses on non-utilitarian aspects of such interactions, including user affect, sensation, and the meaning, as well as value of such interactions in everyday life. The definition of *usability* is stated in the ISO FDIS 9241-210 as the "Extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use." The definition of *User Experience* (UX) in the ISO FDIS 9241-210 is: "A person's perceptions and responses that result from the use and/or anticipated use of a product, system or service."

For this research we will use the the explanation for UX as the *pragmatic quality* (the usability of the product, which addresses the underlying human need for security and control) together with *hedonic quality*, which refers to quality dimensions with no obvious relation to task-related goals such as the aesthetics, innovativeness and self-actualization. In this study we examine UX of the academic staff when developing course material in an educational domain and hence will focus on task oriented goals.

Regarding Evaluator's feedback: Please feel free to comment or provide input regarding the applicability, conciseness and completeness of the factors or anything that could influence the academic's user experience when using the LMS. If a statement could be improved, be sure to let me know. I will appreciate any feedback, positive or negative.

CONCEPTUAL FRAMEWORK UNDER CONSTRUCTION: Intended for exploration of User Experience of academic staff in the use of a Learning Management System tool in an Open Distance electronic Learning (ODeL) institution

Component of user experience	**Principle factors that will influence the user experience with the use of technology**	**Factors that could influence the UX when the academic uses the LMS (*myUnisa*)**	**Evaluator's feedback**				
			Please mark the column that express the importance of the factor in your opinion				**Please provide comments on the conciseness and completeness of the applicable factor**
			Very important	Impor-tant	Neutral	Unimpor-tant	
User – the academic	The academic has certain cognitive and emotional needs when using technology for online course delivery	The academic needs to perceive the system as useful					
		The academic needs to perceive the system to be easy to use					
		The academic needs to feel competent and confident when using the LMS					
		The academic needs to feel independent when using the LMS					
		The academic needs to feel connected to students and colleagues through the use of the LMS					
		The academic needs to feel challenged to take on and master difficult tasks to use the					

Component of user experience	**Principle factors that will influence the user experience with the use of technology**	**Factors that could influence the UX when the academic uses the LMS (*myUnisa*)**	**Evaluator's feedback**				
			Please mark the column that express the importance of the factor in your opinion				**Please provide comments on the conciseness and completeness of the applicable factor**
			Very important	Impor-tant	Neutral	Unimpor-tant	
		LMS					
		The academic needs to feel motivated to use the LMS					
		The academic needs to be able to be creative and feel innovative when using the LMS					
		The academic needs to perceive the LMS as visual attractive					
		The academic needs training to use the LMS					
		The academic needs easy obtainable support					
		Please recommend any additional factors applicable to the cognitive and emotional needs of the academic:					
	The computer literacy skills of	The academic needs to know how to use					

Component of user experience	**Principle factors that will influence the user experience with the use of technology**	**Factors that could influence the UX when the academic uses the LMS (*myUnisa*)**	**Evaluator's feedback**				
			Please mark the column that express the importance of the factor in your opinion				**Please provide comments on the conciseness and completeness of the applicable factor**
			Very important	Impor-tant	Neutral	Unimpor-tant	
	the academic	the technology e.g. how to use the tools that are offered by the LMS					
		The academic requires an understanding of the expected learning outcome					
		The academic requires the knowledge to choose the correct instructional methodologies					
		The academic requires professional development interventions					
		The academic needs to be able to adapt traditional teaching methods to use new teaching and e-learning strategies					
		Please recommend any additional factors applicable to the technology skills of the academic:					
	The academic's predispositions could influence the UX	The academic's attitude towards using the LMS					
		The academic's perceptions of the affordances of the LMS, i.e. the academic needs to know what could be accomplished					

Component of user experience	**Principle factors that will influence the user experience with the use of technology**	**Factors that could influence the UX when the academic uses the LMS (*myUnisa*)**	**Evaluator's feedback**				
			Please mark the column that express the importance of the factor in your opinion				**Please provide comments on the conciseness and completeness of the applicable factor**
			Very important	Impor-tant	Neutral	Unimpor-tant	
		by using *myUnisa*					
		The academic's expectations of the LMS's functionality could influence the UX					
		The academic's fear of the use of technology could influence the UX					
		The academic's lack of practical experience to use *myUnisa* could influence the UX					
	Emotional status (mood) of the academic	The academic's emotional status could influence the UX					
		The academic's perceiving of non-instrumental (aesthetics, pleasure, fun etc.) qualities of the system could influence the UX					
		Please recommend any additional factors applicable to the characteristics, emotions or values of the academic:					

Component of user experience	**Principle factors that will influence the user experience with the use of technology**	**Factors that could influence the UX when the academic uses the LMS (*myUnisa*)**	**Evaluator's feedback**				
			Please mark the column that express the importance of the factor in your opinion				**Please provide comments on the conciseness and completeness of the applicable factor**
			Very important	Impor-tant	Neutral	Unimpor-tant	
System – the Learning management system	The technical usability of the system (LMS)	How the academic will experience the effectiveness, efficiency and satisfaction when using the LMS to achieve specified goals will influence the UX					
		The learnability of the system will influence the UX					
		The flexibility of the system will influence the UX					
		The robustness i.e. responsiveness and recoverability of the system will influence the UX					
	The pedagogical usability of the system (LMS)	How well the LMS facilitates the managing of learning activities					
		The technology must be perceived as appropriate to use for teaching and learning in an open distance institution					
	Reliability of the system (LMS)	The constant availability of *myUnisa*					
		The information security of myUnisa i.e. information must not be lost					
		The response time of the LMS must be swift					
		The power supply must be reliable					
	Quality of professional development facilities will	The quality of the development and support available to the academic to use					

Component of user experience	Principle factors that will influence the user experience with the use of technology	Factors that could influence the UX when the academic uses the LMS (*myUnisa*)	Evaluator's feedback				
			Please mark the column that express the importance of the factor in your opinion				Please provide comments on the conciseness and completeness of the applicable factor
			Very important	Impor-tant	Neutral	Unimpor-tant	
	influence the proficiency of the academic to use the LMS	the online activities and interaction tools.					
		The availability of the development and support to the academic to use the online activities and interaction tools.					
		Development of academics to engage in instructional design for online learning					
		Please recommend any additional factors that will influence the academic that is applicable to the Learning Management system					
Context – Open Distance Learning	The Open distance learning or Open distance e-Learning context defines strategies to align relevant curricula with	The time constraints due to compulsory presentation of multiple modes of delivery i.e. print based, as well as online distribution of teaching material					

Component of user experience	**Principle factors that will influence the user experience with the use of technology**	**Factors that could influence the UX when the academic uses the LMS (*myUnisa*)**	**Evaluator's feedback**				
			Please mark the column that express the importance of the factor in your opinion				**Please provide comments on the conciseness and completeness of the applicable factor**
			Very important	Impor-tant	Neutral	Unimpor-tant	
institution	new policies and innovations						
		The ability and knowledge to follow ODeL strategies					
	Unisa as an academic institution set educational standards & demands time scheduling	The time constraints due to teaching schedules in accordance with Unisa calendars					
		The consistent necessity for interaction with students, tutors and other lecturers by means of the LMS affects the UX					
	Unisa is a large organisational setting with complicated administrative and structural procedures	The time constraints due to administrative schedules and tasks					
	Available additional technologies to be used with *myUnisa* e.g. rich media and multi-directional, multi-user, collaborative toolsets in a distributed web-based environment, OER	The academic's knowledge regarding available media and additional technologies					
		The academic's access to these media					
		The pedagogical appropriateness of the additional media					
		Please recommend any additional factors that will influence the academic that is					

Component of user experience	**Principle factors that will influence the user experience with the use of technology**	**Factors that could influence the UX when the academic uses the LMS (*myUnisa*)**	**Evaluator's feedback**				
			Please mark the column that express the importance of the factor in your opinion				**Please provide comments on the conciseness and completeness of the applicable factor**
			Very important	Impor-tant	Neutral	Unimpor-tant	
		applicable to the ODeL context					

APPENDIX B: QUESTIONNAIRE

User Experience of academic staff when using myUnisa for facilitation of online or blended learning

* Required

(Invitation and participants consent)

We hope that you will be willing to be a participant in this research to gather information regarding the user experience of the academic in the use of the Learning Management Tool, myUnisa. The research is conducted by E de Kock under the supervision of Prof J van Biljon and Dr A Botha. The researcher has ethical clearance from the School of Computing in the CSET and permission to use staff has been obtained from Unisa. The main focus is to explore the user experience of academic staff when they use myUnisa and all questions are regarding the use of myUnisa when facilitating blended or online learning. By blended learning we propose that at least the discussion forum, extra resources and activities tools on myUnisa are being utilised. In the survey we will use the term 'online learning' to refer to 'blended or online learning'. (Note that this study does not investigate the efficacy of the JRouter). The questionnaire is divided into two sections (Sections A and B). The input you provide will be treated confidentially. Participation in this research study is voluntary. You may choose to withdraw at any time. If you choose to do so, your responses will be deleted from the data base and not included in the research. All answers from you and other participants will be analysed collectively. Individual answers will therefore not be linked to any names of participants. It will take approximately 15 minutes to complete this survey.

Section A

Demographic/general information

The name of your College *

- ○ College of Accounting Sciences
- ○ College of Agriculture and Environmental Sciences
- ○ College of Economic and Management Sciences
- ○ College of Education
- ○ College of Human Sciences
- ○ College of Science, Engineering and Technology
- ○ College of Law
- ○ Other:

The name of your Department/School *

The discipline you are teaching online *

Number of Undergraduate modules that you facilitate through myUnisa (blended or fully online) *

Number of Honours or Post Graduate modules that you facilitate through myUnisa (blended or fully online) *

Gender *

- ○ Male
- ○ Female

Position in Unisa *

- Junior Lecturer
- Lecturer
- Senior Lecturer
- Associate Professor
- Professor
- Other:

Age *

- Younger than 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 65
- 66+

How long have you been using myUnisa to facilitate a blended or online module? *

- More than three years
- Two to three years
- One to two years
- Less than a year

How would you describe your general level of computer skills? *

- Novice: I battle to perform electronic tasks expected of me
- Average: I cope with general computer tasks
- High: I perform specialized tasks and learn new skills by myself
- Very high: I do complex computer programming or other specialized tasks and solve my own computer problems

Please indicate which tools you use in your 'most' online course? *

	Not at all	Rarely	Sometimes	Often	Always
Additional Resources					
Announcements					
Blogs					
Course Contact					
Discussions Forums					
Discussions					
FAQs					
Glossary					
Gradebook					
Learning Units					

	Not at all	Rarely	Sometimes	Often	Always
Meetings					
News					
Podcasts					
Questions and Answers					
Schedule					
Self-Assessments					
Statistics					
Syllabus					
Web Content					
Wiki					

Section B

The questions are applicable to your experience when you use myUnisa when facilitating online or blended learning (excluding the jRouter)

1. How do you experience myUnisa when you facilitate online/blended learning?

(Please mark the circle on the scale that you feel is most applicable)

1.1 I enjoy using myUnisa on a regular basis *

1.2 I find myUnisa unnecessarily complex *

1.3 I think myUnisa is easy to use *

1.4 I need the support of a technical person to be able to use myUnisa *

1.5 I find the functions in myUnisa are well integrated *

1.6 I find there are a lot of inconsistencies on myUnisa *

1.7 I would imagine that most people would learn to use myUnisa very quickly *

1.8 I find myUnisa very cumbersome to use *

1.9 I feel confident when I am using myUnisa *

1.10 It was a steep learning curve before I could use myUnisa for facilitation of online learning *

2.

(Please mark the circle on the scale that you feel is most applicable)

2.1 I find the myUnisa features suitable to facilitate online learning *

2.2 I find that I can independently facilitate online learning via myUnisa *

2.3.1 1 I feel connected to students who follow online courses while I facilitate learning using myUnisa

2.3.2 I feel connected to my colleagues when I facilitate learning using myUnisa

2.4 I find pleasure in mastering the intricacies of myUnisa

2.5 I feel that myUnisa enables me to be creative and innovative when I facilitate online learning

2.6 I am skilled in the myUnisa tools that support online learning

2.7 I have the knowledge to choose the correct instructional methodologies to facilitate online learning via myUnisa

2.8 I need professional development interventions (i.e. workshops offered by the CPD) to enhance my online-facilitation skills

2.9 I have aligned my conventional teaching methods to methods suitable for the facilitation of online learning *

2.10 I have the skills to follow ODeL strategies when using myUnisa *

2.11 I have the skills to use available media and technologies for enhancement of facilitation of my online teaching *

2.12 I am positive that myUnisa is a suitable tool to facilitate on-line or blended learning *

2.13 I am informed on the affordances of myUnisa for the facilitation of on-line or blended learning *

2.14 myUnisa has to be functionally adequate for me, as lecturer, to accomplish the necessary on-line learning facilitation tasks *

2.16 I have enough practical experience with the technology to use myUnisa effectively *

2.17 I enjoy using myUnisa even if I am not in a good mood *

2.18 I experience myUnisa as an efficient tool to use for facilitation of online learning *

2.19 myUnisa is flexible and I can easily change things *

2.20 If I make a mistake while using myUnisa, it is easy to retrace my steps and rectify the error *

2.21 myUnisa is constantly available *

2.22 I don't lose information while I use myUnisa *

2.23 The response time of myUnisa is swift *

2.24 myUnisa is an appropriate system to use for facilitation of online learning in an ODL institution *

2.25 It is an enjoyable and fun experience to work on myUnisa *

2.26 The myUnisa user interface is visually attractive *

2.27 I have a negative perception of myUnisa because it introduced the compulsory production of multiple modes of knowledge delivery i.e. print based as well as online distribution of teaching material *

2.28 I do not have enough time for the effective facilitation of on-line learning because of the required production of multiple modes of knowledge delivery i.e. print based as well as online distribution of teaching material *

2.29 I have a negative perception of myUnisa due to inflexible teaching schedules imposed by Unisa calendars *

2.30 I feel negative about the consistent interaction needed between me, the students and/or tutors in an ODL environment (via myUnisa) *

2.31 My experience with myUnisa is negative for the reason of time constraints due to administrative schedules and tasks *

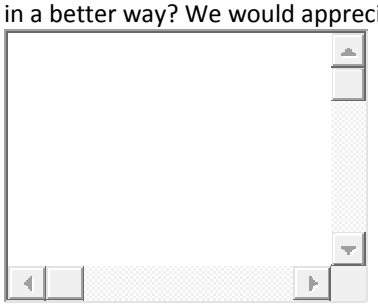
2.32 I feel positive towards myUnisa because of good quality training and support in online activities and interaction tools available to academics *

2.33 I feel positive towards myUnisa because training and support in online activities and interaction tools are available to academics when needed *

2.34 My experience of the development opportunities for academics to use myUnisa is positive *

2.35 I experience myUnisa in a positive light because access to media tools (e.g. graphics, OER's, sound, podcasts, etc.) required to facilitate online learning is readily available *

Could you give any additional comments e.g. are there anything that keep you from utilising myUnisa in a better way? We would appreciate any input (good or bad) :)



APPENDIX C: ETHICAL CLEARANCE

UNISA | college of science, engineering and technology

Ms Estelle de Kock (2812967) 2014-04-22
College of Science, Engineering and Technology
UNISA
Johannesburg

Permission to conduct research project

Ref: 121/EdK/2014

The request for ethical approval for your MSc (Computing) research project entitled "User Experience of academic staff in the use of a Learning Management System tool in an Open Distance electronic Learning (ODeL) institution" refers.

The College of Science, Engineering and Technology's (CSET) Research and Ethics Committee (CREC) has considered the relevant parts of the studies relating to the abovementioned research project and research methodology and is pleased to inform you that ethical clearance is granted for your study as set out in your proposal and application for ethical clearance.

Therefore, involved parties may also consider ethics approval as granted. However, the permission granted must not be misconstrued as constituting an instruction from the CSET Executive or the CSET CREC that sampled interviewees (if applicable) are compelled to take part in the research project. All interviewees retain their individual right to decide whether to participate or not.

We trust that the research will be undertaken in a manner that is respectful of the rights and integrity of those who volunteer to participate, as stipulated in the UNISA Research Ethics policy. The policy can be found at the following URL:
http://cm.unisa.ac.za/contents/departments/res_policies/docs/ResearchEthicsPolicy_apprvCounc_21Sept07.pdf

Please note that if you subsequently do a follow-up study that requires the use of a different research instrument, you will have to submit an addendum to this application, explaining the purpose of the follow-up study and attach the new instrument along with a comprehensive information document and consent form.

Yours sincerely

Chair: College of Science, Engineering and Technology Ethics Sub-Committee

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APPENDIX D: PERMISSION TO INVOLVE UNISA STAFF

PROF L LABUSCHAGNE
EXECUTIVE DIRECTOR: RESEARCH DEPARTMENT
Tel: +27 12 429 6368 / 2446
Email: llabus@unisa.ac.za
Address: Theo van Wijk Building, 10th Floor, Office no. 50 (TvW 10-50)

10 July 2014

Ms E de Kock
School of Computing
College of Science, Engineering and Technology

Dear Ms de Kock

PERMISSION TO DO RESEARCH INVOLVING UNISA STAFF, STUDENTS OR DATA

A study into "User experience of academic staff in the use of a learning management system tool in an open distance e-learning institution"

Your application regarding permission to conduct research involving Unisa staff, students or data in respect of the above study has been received and was considered by the Unisa Senate Research and Innovation and Higher Degrees Committee (SRIHDC) on 05 June 2014.

It is my pleasure to inform you that permission has been granted for this study as set out in your application.

We would like to wish you well in your research undertaking.

Kind regards

PROF L LABUSCHAGNE
EXECUTIVE DIRECTOR: RESEARCH

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